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Ethnic Stereotypes, Prejudicial Attitudes, and Education

This paper examines the assumption often made in the sociology literature that stereotype and prejudice are equivalent phenomena through study of the variation of both dimensions of ethnic attitudes by education. The well-established negative relationship between prejudice and education was affirmed. However, the finding that stereotype varied directly with education suggests that the cognitive and affective dimensions of ethnic attitudes ought to be conceptually separated and independently measured. (Dr. Mackie is Associate Professor of Sociology in the Faculty of Arts and Science/Sociology, The University of Calgary.)

A substantial proportion of attitude research is concerned with degree of acceptance of ethnic minorities. The social science literature also abounds with studies of folk perception of its social and in particular, its ethnic group environment. However, the empirical relationship between prejudice and stereotype has received surprisingly little attention. Instead, a tacit assumption of their equivalence prevails in both definition specification and measurement of these variables.

Stereotypes are commonly viewed as the cognitive dimension of prejudice. The possible impact of factors other than affection or antipathy upon group imagery is thereby underplayed. For example, Ehrlich (1962, p. 171) describes stereotypes as "the language of prejudice" and Katz and Braly (1935) define prejudice as "a set of stereotypes." Allport (1954, p. 187) holds that "a stereotype is an exaggerated belief associated with a category. Its function is to justify (rationalize) our conduct in relation to that category." This position is supported by cognitive dissonance theory which predicts congruency between beliefs about and feelings toward ethnic groups.

The manner in which prejudice has been operationalized has contributed to its conceptual equation with stereotype. Such attitude scales typically include stereotype items of a derogatory nature. For example, Likert's (1967, p. 90) first rule of scale construction states that:

It is essential that all statements be expressions of *desired behavior* and not statements of *fact*. Two persons with decidedly different attitudes may, nevertheless, agree on questions of fact. [Emphases in original]

Such directives have encouraged confusion of ethnic percepts generally with the negative imagery used in prejudice scales and obscured the fact that folk impressions contain neutral "factual" and flattering traits as well.

Empirical documentation of a direct relationship between disliking a group and stereotypy is equivocal. Katz and Braly (1958) found that those ethnic groups most preferred by one sample were described in terms of traits rated highly favorable by another sample. Campbell (1947) reported high correlations between social distance from five ethnic groups, affection for these groups, and beliefs about their intelligence and morality. On the other hand, Ehrlich and Van Tubergen (1967) failed to establish a close relationship between stereotypy and prejudice. Finally, Peabody (1968) who dissected the terminology of stereotypy into evaluative and descriptive components, found that groups tended to disagree about the evaluation but to agree on the descriptive characteristics of each other. In other words, the old saw, "I am firm, you are obstinate, he is pigheaded" also seems to describe intergroup perception.

This paper approaches the theoretical question through analysis of the relationship between ethnic attitudes and education. Aside from social action considerations, the primary reason for this strategy is the social science disciplines' knowledge of the variability of prejudice with education. Harding *et al.* (1969, p. 28) have stated that "the most dependable finding in this area is the negative correlation between prejudice of most kinds and amount of formal education." A further consideration is the type of samples drawn in stereotype studies. The group imagery reported in the literature is mostly that of university students. In view of the known impact of education upon feelings toward minority groups, it seems unlikely that increased schooling leaves the cognitive dimension of ethnic attitudes untouched. Therefore, it is unwise to assume that a random sample of images results from any selection design.

Two questions emerge. The first inquires into the relationship between stereotypy and prejudice. Specifically, does the influence of formal education discourage expression of stereotypic images of, as well as hostility toward, minority groups? The second asks how continual use of student samples has affected the generality of findings reported in the stereotype literature.

The initial hypotheses held that more formal schooling would be negatively associated with stereotypy.¹ It was suspected that since everyone has at least rudimentary impressions of national character, extended education results in exposure to the liberal position that it is neither intelligent nor ethical to stereotype ethnic groups, rather than to the eradication of categorical perception *per se*. Therefore, it was hypothesized that highly educated people would more willingly reveal their stereotypes of *nonethnic* groups. [Thielbar and Feldman (1969, p. 69) said they encountered much less resistance from a university student sample to stereotyping occupational groups than did one of the same investigators us-

ing a comparable sample and technique but ethnic referent groups.] It was predicted that the dominant pattern would be increasing education—decreasing stereotypy. However it was expected that as education increases, a greater proportion of the stereotypy would be nonethnic stereotypy. Finally, the well-established negative relationship between prejudice and education was predicted. In sum, if the prevalent assumption of their equivalent is correct, both prejudice and stereotypy should decrease as amount of schooling increases.

Method

Respondents

Research objectives required both the extension of the sample beyond the usual student groups and the use of instruments which demanded considerable time and attention from respondents. Cost ruled out the individual administration of instruments to a randomly drawn sample. Therefore, stereotypes were collected from 590 respondents located in 25 Edmonton, Alberta organizations which were chosen to assure coverage of age, sex, and education ranges. The groups included a labor union, a motorcycle club, nursing students, the clerical employees of a bureaucratic organization, a senior citizens' recreation club, a Canadian Legion group, a women's lodge, several men's service clubs, and community league groups chosen from various socioeconomic areas of the city. Respondents' education was as follows: 177 had completed two years or less high school (10th grade or less), 279 had completed three to five years high school (11th to 12th grade), 131 had completed one or more years of university. Three did not provide this information.

Instruments

A stereotype refers to those folk beliefs about the attributes characterizing a social category (and differentiating it from other categories) on which there is consensus. Although the definition omits reference to stereotype inaccuracy (Mackie, 1973), it otherwise conforms to decades of academic usage (Vinacke, 1957).

Two indicators of stereotypy were used, an *openended questionnaire* and a *semantic differential*. The instruments were randomly distributed in such a way that half the respondents from each sample organization received each instrument. Both measured impressions of North American Indians, Ukrainians, Hutterites, Jews, lawyers, school teachers, lower class, women, and old people. Stimulus group order was randomized. The ethnic groups were introduced as follows: "In comparison with Albertans generally, Ukrainians tend to be." The nonethnic group presentation omitted geographical reference: "Lawyers in general tend to be."

The *openended questionnaire* (OEQ) asked respondents to make 10 descriptive statements about each group. A content analysis was done of the 300 sets of free verbal descriptions. For the comparative purpose of this particular analysis, traits mentioned by 10% or more of the sample and subsamples were considered part of the stereotype.

The *semantic differential* (SD) required respondents to rate the stimulus groups on a set of 29 seven-point bipolar adjectival scales.² Direction of

scale polarity was varied according to a randomly designed pattern. Scale positions were afterwards labelled from 1 to 7, the first position in each case being the socially desirable pole. Following Gardner *et al.* (1968), a stereotype was operationally defined as those attributes for which consensuality existed in extreme (non-neutral) scale positions. More specifically, scales with mean scale values of between 1 and 2.5, and between 5.5 and 7 were defined as traits, provided that the average deviation was less than 1.5 scale units.

Prejudice was measured with *Bogardus social distance* scales. A method was needed which did not involve stereotype items, which measured respondents' feelings toward the same four ethnic groups for which they had provided stereotypes, and which did not impose unduly on their patience after the lengthy stereotype measurement procedure. The list of 24 ethnic groups was taken from a previous Alberta study (Hirabayashi, 1963). (The rank order correlation between previous and present results was .94.) As is customary, the social distance quotient (SDQ) for a given ethnic group was determined by computing the mean of the number beside the most intimate relationship permitted by respondents. To avoid the dubious assumption of equality of intervals, the resulting scores were used to order groups.

Indices of Stereotypy

The two indices described below were developed for this study. *Amount of stereotypy* is a standardized measure of the number of traits consensually assigned by the total sample or education sub-samples to a given stimulus group, or to combinations of stimulus groups. For both instruments, this variable is expressed in terms of the proportion of operationally defined stereotype traits to the total number of coded traits. In order to be included in a particular stereotype (and in the numerator of this measure), a trait has met the above criteria of consensuality. The denominator is the total pool of characteristics available for differential assignment to a stimulus group or groups.

The amount of stereotypy for SD samples was calculated as follows:

Amount of stereotypy for one stimulus	=	$\frac{\text{Number of traits}}{29}$
Amount of ethnic stereotypy	=	$\frac{\text{Total traits assigned to Indians, Ukrainians, Hutterites and Jews}}{29 \times 4}$
Amount of nonethnic stereotypy	=	$\frac{\text{Total traits assigned to lawyers, teachers, lower class, women and old people}}{29 \times 5}$
Overall amount of stereotypy	=	$\frac{\text{Total traits assigned to 9 groups}}{29 \times 9}$

The amount of stereotypy for OEQ samples is the proportion of the number of traits which exceeded the 10% level to the base of the total coded

attribute categories relevant to a particular group or combination of groups. Because a small number of descriptive categories were coded exclusively for one group, the base varies slightly from group to group. For example, "communal social organization" and "senile" have unique application to Hutterites and old people, respectively.

The combined OEQ measures of amount of stereotypy parallel the SD measures:

Amount of ethnic stereotypy	=	Total traits assigned to 4 ethnic categories
		51 + 52 + 53 + 52
Amount of nonethnic stereotypy	=	Total traits assigned to 5 nonethnic categories
		53 + 52 + 52 + 51 + 57
Overall amount of stereotypy	=	Total traits assigned to 9 groups
		473

Degree of stereotypy, which is similar to the intensity dimension of an attitude, is a measure of the extremity of assignment of SD traits. To prevent contamination of polarity of ascription with number of traits, the basis for measurement is the total number of adjectival scales contained in the instrument, rather than those which have met the requirements for inclusion in the stereotype. The standard deviation provided a model for the conceptualization of this index.

The following procedure was used to measure the degree of stereotypy demonstrated by the total sample (or educational sub-samples) toward one stimulus group: the group means for each of the 29 scales were listed; the deviation of each of the 29 means was taken from the neutral 4.00 value; each difference was squared and the 29 squared deviations summed; the sum of the squared deviations was divided by N (29), and the square root derived. To measure the combined degree of ethnic stereotypy, the respective Σd^2 for the Indians, Ukrainians, Hutterites, and Jews were totalled, divided by 116 (29 x 4), and the square root was derived. The combined degree of nonethnic stereotypy was calculated in the same fashion.

Results

Amount of Stereotypy

Before turning to a discussion of the relationship between education and amount of stereotypy, which is given in Tables 1 and 2, several general observations are in order. The size of a particular stereotype is a function of *inter alia* both the clarity of the perceived differences between that group and the containing population, and the instrument with which it was measured. For example, the relatively high rate of stereotypy for lawyers and the relatively low rate for Ukrainians across instruments is indicative of the degree of elaboration of the images of these *vis-à-vis* other groups. However, the fact that the SD rate of ethnic stereotypy is considerably higher than the rate of nonethnic stereotypy partially reflects an instrument artifact. Since the primary purpose of the larger study of which this report is a part was to gather ethnic stereotypes, the number of scales

available for nonethnic group description was restricted; more detailed non-ethnic stereotypes emerged with the freedom afforded by the OEQ. SD rates are generally higher than the comparable OEQ figures because large OEQ denominators were the product of a detailed content analysis. Therefore, comparison of sub-sample stereotypy rates is meaningful within but not between instruments.

TABLE 1
EDUCATION AND AMOUNT OF STEREOTYPY, SEMANTIC DIFFERENTIAL

Stimulus Groups	Educational Level		
	(1) 2 years or less high school N = 88	(2) 3 - 5 years high school N = 132	(3) 1 or more years university N = 68
Indians	.138	.448	.655
Ukrainians	.241	.138	.310
Hutterites	.586	.621	.689
Jews	.621	.586	.759
Teachers	.586	.414	.414
Lawyers	.586	.655	.655
Lower Class	.103	.103	.138
Women	.310	.276	.310
Old People	.276	.276	.310
Overall Amt. Stereotypy	.383	.391	.471 a
Amt. Ethnic Stereotypy	.397	.448	.603 b
Amt. Non-Ethnic Stereotypy	.372	.345	.366 c

a χ^2 , $p < .10$, two-tailed, d.f. = 2.

b χ^2 , $p < .01$, two-tailed, d.f. = 2.

c χ^2 , $p < .90$, two-tailed, d.f. = 2.

γ , total groups, columns 1, 2, 3, high proportion ties.

γ , ethnic groups, columns 1, 2, 3 = $-.80$.

γ , non-ethnic groups, columns 1, 2, 3, high proportion ties.

γ , total categories, columns 1 and 3 = $-.96$.

γ , ethnic groups, columns 1 and 3 = -1.00 .

γ , non-ethnic groups, columns 1 and 3 = $-.80$.

It was predicted that as amount of education increased, amount of stereotypy would decrease. This expectation is not supported by the findings. In fact, just the opposite relationship emerged: as amount of education increased, amount of stereotypy increased. The OEQ χ^2 (Table 2) is significant at the .001 level and the association is a strong one (gamma $-.94$). Although the SD relationship (Table 1) is in the same direction as the OEQ results, it does not reach significance until the .10 level. However, the

TABLE 2
EDUCATION AND AMOUNT OF STEREOTYPY, OPEN-ENDED QUESTIONNAIRE

Stimulus Groups	Educational Level		
	(1) 2 years or less high school N = 89	(2) 3 - 5 years high school N = 147	(3) 1 or more years university N = 63
Indians	.196	.294	.294
Ukrainians	.154	.269	.308
Hutterites	.170	.283	.302
Jews	.115	.231	.250
Teachers	.094	.226	.283
Lawyers	.212	.385	.365
Lower Class	.173	.269	.250
Women	.235	.294	.314
Old People	.193	.316	.316
Overall Amt. Stereotypy	.171	.285	.298 a
Amt. Ethnic Stereotypy	.159	.269	.288 b
Amt. Non-Ethnic Stereotypy	.181	.298	.306 b

- a χ^2 , $p < .001$, two-tailed, d.f. = 2.
b χ^2 , $p < .01$, two-tailed, d.f. = 2.
 γ , total groups, columns 1, 2, 3 = $-.94$.
 γ , ethnic groups, columns 1, 2, 3 = -1.00 .
 γ , nonethnic groups, columns 1, 2, 3 = $-.80$.
 γ , total categories, columns 1 and 3 = -1.00 .
 γ , ethnic groups, columns 1 and 3 = -1.00 .
 γ , non-ethnic groups, columns 1 and 3 = -1.00 .

relationship between amount of education and the two extreme education samples is high (gamma $-.96$).

It was expected that within the general pattern of low education-high stereotypy (since disconfirmed), those with more schooling would exhibit a greater amount of nonethnic stereotypy and a lesser amount of ethnic stereotypy than would their less well educated counterparts. The within-category difference between rates of ethnic and nonethnic stereotypy does indeed increase as education level increases for the SD data. However, the relationships between education and amount of ethnic/nonethnic stereotypy are not those predicted. Rates of nonethnic stereotypy remain stable across education samples, while amount of ethnic stereotypy increases with education (Table 1). The between-category differences in the amount of ethnic and nonethnic stereotypy do not increase across education levels in the case of the OEQ results, since both ethnic and nonethnic stereotypy rates are positively related to amount of education (Table 2).

The principal finding is the unexpected positive relationship between amount of ethnic stereotypy and education. This relationship is significant at the .01 level for both instruments and the measures of association are strong (-.80, -1.00). When amount of ethnic stereotypy of Ss with two years or less high school was compared with that of university graduates, χ^2 was significant at the .01 level for the SD data, and at the .001 level for the OEQ data. Both gammas were -1.00.

At the outset, it was predicted that more highly educated people would exhibit a higher rate of stereotypy toward nonethnic groups on the ground that people are seldom criticized for expression of this type of generalizing statement. The results are mixed. The SD relationship is clearly nonsignificant. However, a positive relationship between amount of nonethnic stereotypy and education reached significance at the .01 level for the OEQ data. Because of ties, gamma could be computed for only the OEQ data. However, when amount of nonethnic stereotypy was considered in relation to those with two years or less high school and those with one or more years of university, a strong positive ordinal association emerged from both sets of data. When the lowest education sample was compared with university graduates, gamma was stable at -.80 for the SD and -1.00 for the OEQ.

In summary, amount of ethnic stereotypy increases with education on both instruments. The OEQ data show a positive relationship between education and amount of nonethnic stereotypy. SD results show no significant difference between education samples in amount of nonethnic stereotypy. However, when ordinality rather than frequencies is considered between education extremes, those with high education demonstrate more nonethnic stereotypy.

The foregoing SD results are clarified by analysis of the education samples' scale checking response style. Osgood *et al.* (1958, p. 226) reported that the better educated used the intermediary scale positions (2, 3, 5 and 6) relatively more frequently than the polar (1, 7) or neutral (4) scale positions. Less well educated people demonstrated contrary preferences. The results of the present study confirm this observation (χ^2 , $p < .001$). Since SD scales were defined as stereotype traits when the means deviated from "4", the scale checking response style of the less well educated operates to produce a greater amount of stereotypy. Thus, the positive relationship between amount of ethnic stereotypy and educational level resulted despite this effect.

On the other hand, some association between amount of stereotypy and level of education could be expected to emerge from the advantage presented by the OEQ to those accustomed to giving their thoughts written expression. Although the instructions asked respondents to list 10 traits for each group, inspection of the median number of words used by education samples in their description of each group indicated that fluency did increase with education (gamma 1.00). This factor has some bearing on the finding that amounts of both ethnic and nonethnic stereotypy also increase with years of schooling.

In short, amount of ethnic stereotypy was found to be strongly related

to higher education when instrument error worked both for it, in the case of the semi-projective technique, and against it, in the case of the SD.

Degree of Stereotypy

Table 3 presents the relationship between education and degree of stereotypy. As amount of education increased, degree of stereotypy was expected to decrease. As Table 3 shows, the data fail to support this hypothesis: as amount of education increases, degree of stereotypy increases. Gamma calculated across the three education samples is -.74. When respondents with two years or less high school were compared with those with some university, the relationship was strengthened (gamma -.85).

TABLE 3
EDUCATION AND DEGREE OF STEREOTYPY, SEMANTIC DIFFERENTIAL

Stimulus Groups	Education Categories		
	(1)	(2)	(3)
	2 yrs. or less high school N = 88	3 - 5 yrs. high school N = 132	1 or more yrs. univ. N = 68
Indians	1.1760	1.4061	1.5982
Ukrainians	1.1105	0.9896	1.2120
Hutterites	1.6754	1.7886	1.9820
Jews	1.5606	1.6366	1.8782
Teachers	1.6626	1.4157	1.4339
Lawyers	1.7982	1.8025	1.8123
Lower Class	0.7061	0.8263	0.8649
Women	1.3229	1.2626	1.2656
Old People	1.1566	1.2223	1.2774
Degree of Ethnic Stereotypy	1.2385	1.4859	1.6940
Degree of Non-Ethnic Stereotypy	1.3844	1.3434	1.3656

γ , total groups, columns 1, 2, 3 = -.74.
 γ , ethnic groups, columns 1, 2, 3 = -.95.
 γ , non-ethnic groups, columns 1, 2, 3 = -.51.
 γ , total groups, columns 1 and 3 = -.85.
 γ , ethnic groups, columns 1 and 3 = -1.00.
 γ , non-ethnic groups, columns 1 and 3 = -.39.

The amount of within-category difference between degree of stereotypy of ethnic and nonethnic groups increases as predicted as one moves from the lowest to the highest education sample (-0.1459, 0.1425, 0.3284). However, the degree of stereotypy components did not behave as expected. Degree of ethnic stereotypy increases rather than decreases with education. Further, although the lowest education sample exhibited the highest degree

of nonethnic stereotypy, the rate remains rather stable across education categories. The ordinal pattern of degree of stereotypy supports these generalizations. Moreover, when university graduates were extracted from those with some university training, and compared with those with two years or less high school, the positive relationship between degree of ethnic stereotypy and amount of education remains stable (gamma -.95) but the corresponding gamma for degree of nonethnic stereotypy drops to +.47.

Social Distance and Stereotypy

This section has two objectives: first, to ascertain whether the well documented negative association between education and prejudice (as measured by the SDQs for 24 ethnic groups including the four for which stereotypes were gathered) holds true for the study sample; second, to critically examine the assumed close relationship between stereotypy and prejudice.

Table 4 summarizes the statistical analysis of the SDQs for the 24 groups by education. (Although space does not permit presentation of the 192 figures involved, they are available upon request.) In general, low education was found to be associated with high social distance. A discrepancy did emerge from comparison of respondents with three to five years high school with those with one or more years of university (SD and OEQ gammas, -.16 and -.78 respectively). However, when university graduates were substituted for the latter sample, the predicted relationship was maintained.

TABLE 4
SUMMARIZING STATISTICS, SOCIAL DISTANCE QUOTIENTS BY
EDUCATION SAMPLES

Summary Statistic	Education Categories			
	2 yrs. or less HS	3 - 5 yrs. HS	1 or more yrs. univ.	univ. grads.
<u>Semantic Differential</u>	(1)	(2)	(3)	(4)
Median	2.21	1.87	1.71	1.48
Range	2.74	2.53	2.52	1.74
<u>Openended</u>	(5)	(6)	(7)	(8)
Median	2.38	1.80	1.78	1.60
Range	3.20	2.45	2.43	2.33
γ , columns 1, 2, 3 = .80		γ , columns 5, 6, 7 = .58		
γ , columns 1 & 3 = .99		γ , columns 5 & 7 = 1.00		
γ , columns 1 & 2 = .99		γ , columns 5 & 6 = 1.00		
γ , columns 2 & 3 = -.16		γ , columns 6 & 7 = -.78		
γ , columns 1, 2, 4 = .99		γ , columns 5, 6, 8 = .99		
γ , columns 2 & 4 = .99		γ , columns 6 & 8 = .96		

If stereotypy and prejudice are in fact synonymous, the following relationships should preponderate: low social distance associated with low stereotypy; high social distance associated with high stereotypy. Samples

which exhibit low social distance should not express high amounts of stereotypy. Neither the reverse, nor mixed variable combinations should occur very frequently. A ranking of SDQs and amount of stereotypy indices between all education categories yielded 48 rank orderings (6 sample comparisons x 4 ethnic groups x 2 instruments). Only five are in the predicted direction of covariance between stereotypy and prejudice. In 40 of the cases, the findings are inconsistent with the presupposition: samples which ranked highest on social distance expressed the least stereotypy. Two sample comparison show high social distance and identical stereotypy indices and one resulted in low stereotypy and the same SDQs.

Rank orderings of SDQ and degree of stereotypy indices were again compared between all combinations of education samples. High social distance and low stereotypy emerged in 21 cases. Only two instances of high social distance—high stereotypy and one of low social distance—low stereotypy supported the equivalence of stereotypy and prejudice.

So far, the relationship between education and stereotypy has been considered in terms of number of characteristics assigned to stimulus groups and extremity of scale usage. Perhaps, those hostile toward the stimulus groups produced a small number of negative traits which were not applied by friendlier respondents. In other words, the above findings could mask distinctive types of trait assignment which vary with years of schooling. It appears that the erroneous equation of stereotypy and prejudice derives precisely from this failure to appreciate the fact that categorical percepts also encompass flattering and neutral traits. Scrutiny of the relationship between social distance position and type of trait was therefore necessary. The Indian stereotype (the most negative of the four ethnic stereotypes collected) was selected for this purpose.

TABLE 5
ASCRPTION OF SELECTED INDIAN TRAITS BY EXTREME SOCIAL DISTANCE CATEGORIES, OPEN-ENDED SAMPLE

Trait	Social Distance		χ^2 , 2-tailed, 1 d.f.	
	1 + 2 N=189	5, 6, 7 N=41		
Poor	34.4%	9.8%	9.74	p < .01
Uneducated	31.7	24.4	0.88	p < .50
Lazy	24.3	41.5	5.03	p < .05
Drunken	19.0	24.4	0.31	p < .70
Dirty	25.4	31.7	0.67	p < .50

Table 5 compares the ascription to the Indians of two factual traits (poor, uneducated) and three decidedly uncomplimentary traits (lazy, drunken, dirty) by OEQ respondents willing to accept the Indians to kinship or friendship versus those who would admit them only as citizens or visitors to Canada, or approve their exclusion from that country. Only one trait, lazy, supports the expectation that a significantly greater number

of prejudiced respondents would demonstrate negative stereotypy. Although there is a significant difference in the assignment of "poor", the less prejudiced group produced the higher frequency.

A parallel analysis of SD results did show unflattering trait means to be significantly higher for the prejudiced group. No statistically significant differences were found in the assignment of the neutral (descriptive) traits.

Finally, type of trait ascription by education samples was examined, respondents with two years or less high school being compared with those with some university training. The findings are easily summarized. In the case of both the OEQ sample where response set operated in favor of greater stereotypy among the well educated, and the SD sample where response set had the reverse effect, significant differences in trait assignment were found for the impartial rather than the uncomplimentary characteristics (lazy, drunken, dirty). Furthermore, the higher stereotypy was not exhibited by the less well educated.

Analysis of several other demographic samples supported the conclusion that prejudice and stereotypy are variables which operate with a sizeable measure of independence. The relationship between sex and stereotypy and between sex and social distance covaried for the SD and acted in opposite directions for the OEQ. The same held true for the age samples. SES categories revealed a completely reversed pattern of stereotypy and prejudice on both instruments. Moreover, controls for age and sex did not materially alter the outcome reported in this section with respect to education. While the study design does not eliminate the possibility that the results were produced by concomitant variables rather than by education *per se*, Bettelheim and Janowitz (1964, p. 18) state that:

On the basis of some 25 national sample surveys since 1945, the positive effect seems to be real, not spurious. The lower levels of prejudice among the better educated seem to involve the social experience of education specifically and not merely the sociological origins of the educated.

Discussion

The initial hypotheses held that the more highly educated would be least likely to stereotype ethnic groups. The converse proved to be true. This paper has treated concomitancies of education rather than its causal influence and such correlational results must, of course, be interpreted with caution. However, the findings do suggest that a stereotype literature built upon student beliefs probably exaggerates the stereotypy existent in the general population.

Several explanations may account for this somewhat surprising outcome. Perhaps, categorical descriptions are gaining acceptability in the North American milieu of groups striving to preserve their cultural identities. Alternatively, an answer may be found in the proposition that educated people are simply more accustomed to thinking in terms of abstract generalizations. An extension of such thought patterns to ethnic phenomena appears more likely when the pejorative label "stereotype" is not implicated, as was the case here. A more straightforward interpretation may be that educated people have been exposed to more information concerning minority group differentiae.

The point to be emphasized is the contrast between the present results and the repeatedly observed relationship between high education and low prejudice. This discrepancy suggests that cognitive imagery and affectivity should not be conceptualized or measured as equivalent phenomena.

Although cognitive balance theories predict a congruence between sentiments and beliefs, it seems that other variables intrude upon the individual's tendency to perceive an ethnic group as a faithful reflection of his evaluation of it. "Real" minority group characteristics present an impediment to autistic productions. If increments of education are assumed to carry increments of information, this constriction should forceably impinge upon those with more formal schooling. For example, an educated person who dislikes Indians may nevertheless have learned that they do not differ from whites in intellectual ability. One who admires them may still know that their educational attainment is lower than that of non-Indians.

In short, stereotypes do not function merely as rationalizations for prejudice. Such imagery may also result from the need to structure cognitively the group environment, the development of which may be fostered through educational experience.

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¹ Exposure to social science courses in particular should curb expression of stereotypy. Campbell (1967, p. 823) observed that "there has grown up in social and educational psychology a literature and a teaching practice which says that all stereotypes of group differences are false, and, implicitly, that all groups are on the average identical."

² The following scales used: materialistic-not materialistic, religious-irreligious, old fashioned-up to date, ambitious-unambitious, rural-urban, oppressed-not oppressed by others, naive-shrewd in dealing with other groups, contributing-a burden upon our country's financial resources, liked-disliked by other groups, neglectful-not neglectful of the needs of their children, rich-poor, drunken-sober, pacifistic-not pacifistic, likely to have large-small families, sexually moral-immoral, mentally healthy-ill, competitive-cooperative, hard-working-lazy, healthy-sick, seldom-often in trouble with the law, cliquish-not cliquish, educated-not educated, self-sufficient-not self-sufficient, greedy-generous, frivolous-thrifty with money, dirty-clean, seldom-often involved in physical fights, characterized by unstable-stable marriages, characterized by the belief that it is important-unimportant to get a university education.

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J . J . B E R G E N

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A Comparative Analysis—Councils of Ministers of Education in Canada and West Germany

The provinces of West Germany exercise autonomy in educational matters as do those of Canada. The German Conference of Ministers of Education, established in 1948, is the main agency acting in the interest of inter-provincial cooperation and coordination of educational concerns. Its impact also has been substantial at the federal level and its influence has extended to the international scene. Even though consensus is required among the eleven ministers of education for any decision to be implemented in all provinces, and even though no decision of the Conference is constitutionally enforceable in any one province, an impressive body of Conference decisions have been adopted uniformly within all the provinces. The creation of a federal ministry of education in 1969 may have increased rather than inhibited the effectiveness of the Conference.

The West German Conference of Ministers of Education served as a model for the establishment of the Council of Ministers of Education (Canada) in 1967. Like its German counterpart, the Council serves coordination, information and liaison purposes at the inter-provincial and provincial-federal levels. In its relatively short existence it already has made a perceptible impact at the provincial, inter-provincial and federal levels, and has become directly involved at the international level in educational matters. Operating in a cultural and political context much different from that of West Germany, the Council will have its own set of goals to achieve and may never quite attain the policy-making power of the German Conference. (Dr. Bergen is Associate Professor in the Department of Educational Administration, The University of Alberta.)

Introduction

Most countries have national ministries or offices of education. This article examines alternative mechanisms developed in two countries which had no national governmental authorities in education. One of these, West Germany—the Federal Republic of Germany—subsequently has established a federal ministry of education.

Canada comprises ten provinces and the northern territories. West Germany—Bundesrepublik Deutschland (BRD)—consists of eleven provinces (Laender), three of which (Hamburg, Bremen and West Berlin)

are city provinces. Though differing in structural detail, both countries have federal systems of government. More and greater powers are concentrated in the federal government of the BRD than in that of Canada (Thraenhardt, 1968, p. 61). Unlike the Canadian constitution, that of the BRD is more readily amendable, and in fact has been amended every year since its establishment in 1949. Upon agreement of the British, French and American occupying powers the 1949 Constitution (Grundgesetz) of the BRD placed all matters regarding education under the authority of the provincial legislatures (Froese, 1969, p. 283). However, an amendment of the constitution in 1969 made possible the establishment of a Federal Ministry of Education and provided the federal parliament with powers respecting regulation of general conditions governing higher education and participation in the establishment and extension of universities (Hoehne, 1972, p. 19). The British North America Act of 1867 gave to the legislatures of the Canadian provinces the exclusive right to make laws in relation to education. This constitutional provision has never been amended.

Establishment of a Council of Ministers

As neither country had a national ministry or office of education, there were apparent needs for establishing organizations or agencies through which information could be exchanged and through which suitable co-ordinative functions could be exercised. In Canada this need was met, in part, for many decades by the Canadian Education Association (CEA) which was founded in 1892 under the name of the Dominion Education Association, and which bore the name of the Canadian and Newfoundland Education Association from 1938 to 1946. As early as 1898 a committee of this Association discussed the concept of a national bureau of education with Laurier, who was Prime Minister at the time. The Hon. de la Bruère, Superintendent of Public Instruction for the Province of Quebec, opposed the proposal on constitutional grounds. In 1909, and again in 1913, 1917, and 1942 the subject was raised by the Association. However, in 1942 the matter was not taken to the federal government. Instead the Association moved to set up its own permanent secretariat. C. E. Phillips served part-time as its first secretary until F. K. Stewart was appointed in 1947. For reasons imbedded in the national political climate, the office remained in Toronto and suggestions to move it to Ottawa were not given serious consideration. Another organization, the National Council of Education, met about four times between 1917 and 1929 with the determined purpose of calling for the establishment of a national bureau of education (Wernecke, 1970, pp. 276-292).

Ministers of Education attended the conference of the CEA as individual members of the Association until a Standing Committee of Ministers of Education was formed within the CEA in 1960. Its object was to discuss matters of mutual concern and to make recommendations to the Board of Directors of the CEA. The Committee first met under the chairmanship of J. P. Robarts, at the time the Ontario Minister of Education (Stewart, 1961, p. 77).

In 1965 the Standing Committee considered a proposal suggesting operational alternatives prepared by W. C. Lorimer, at the time president of

the CEA and Deputy Minister of Education for Manitoba. An *ad hoc* committee was created to examine these carefully. Subsequently, Kurt Frey, Secretary-General of the Standing Conference of the Provincial Ministers of Education of the BRD—Kultusministerkonferenz (KMK)—was invited to speak at the Interprovincial Conference on Education and Human Resources in Montreal in September, 1966 (Frey, 1966). F. K. Stewart, Executive Secretary of the CEA, suggested that a delegation visit the Bonn Secretariat. In July of 1967 Stewart was accompanied by Neil Perry and Lyle Bergstrom, Deputy Ministers for British Columbia and Saskatchewan respectively, and Jean-Marie Beauchemin, Associate Deputy Minister of Education for Quebec. They examined the operation of the KMK Secretariat (Stewart, 1974). In September of the same year the Council of Ministers of Education (Canada) was formed. F. K. Stewart served as secretary during an interim arrangement with the CEA. When the Council's own Secretariat was established in 1968, E. J. Quick served as acting executive secretary (Stewart, 1968, p. 53). Since 1969 Maurice Richer has held this office with the title of secretary-general of the Council (CMEC).

German inter-provincial co-ordinating agencies for education were functional as early as 1871. During the post-war occupation, regional co-ordinating agencies were established in each of the zones under the control of the French, British and American powers. When the zones were merged in 1948, these agencies were consolidated to form the KMK. Eventually the constitutional legality of this body was challenged, so an arrangement was made in 1959 whereby the KMK was placed under the authority of the city province West Berlin for general civic administrative purposes. Officially its budget is subject to the scrutiny of the government of West Berlin. However, the Secretariat retains its location in Bonn, and by agreement with West Berlin all organizational and internal administrative authority rests with the KMK (*Aus der Arbeit*, 1971, pp. 5, 17).

In each country the Council of Ministers of Education is financed jointly by the provinces.

Goals and Objectives

When the KMK was established, its immediate goals included the following:

1. reconciling educational policies and practices of the eleven provincial governments;
2. reconciling the paradox of complete provincial control in education and the general expectation and demand for a considerable degree of uniformity in regulation; and,
3. collectively representing provincial interests at the federal level.

The first phase of the activity of the KMK was concerned with the reconstruction of German education, the achievement of a degree of conformity among provincial school systems, and the standardization of certification procedures. During its second phase (about 1955-61) the KMK concentrated its attention on the development of science and research, and on the establishment of new forms of working relationships with the provinces, the federal government, and the institutions of higher learning. The third phase (about 1961-67) of the KMK's activity was focused on political and cultural developments, general educational planning, the encouragement of

innovations in education, and relationships with other countries. In more recent years the KMK has been involved in specific reforms in schools and post-secondary institutions, over-all national educational planning, encouragement of participation in educational decision-making by all concerned publics, increasing the educational opportunities for every individual, and in the establishment of guidelines (Rahmenrichtlinien) within which the development of educational programs may be facilitated (*Aus der Arbeit*, 1971, pp. 6-13).

The CMEC was set up to achieve the following goals:

1. to enable the ministers of education to consult on matters of common interest;
2. to provide a means for co-operation among provincial governments in areas of mutual interest in education;
3. generally, to serve functions with respect to co-ordination, information, and liaison; and,
4. to serve these functions at inter-provincial, provincial-federal and international levels.

Areas of interest and concern to which the CMEC has directed its attention since its establishment in 1967 include legislation with respect to manpower and the implementation of the Adult Occupational Training Act, problems relating to post-secondary financing and student assistance, common curriculum concerns such as those involving conversion to the metric system, second language instruction, and educational media. A current major undertaking is the OECD study of educational policies in Canada. This study is financed jointly by the federal and provincial governments, the federal government carrying the major part of the cost (*General Information*, 1974).

Organizational Structure

The Plenary Assembly (Amtschefskonferenz) of the KMK, which meets about every two months, comprises the eleven provincial ministers of education. One of the ministers presides as president of the KMK. The executive includes two vice-presidents. As the goal of the KMK is to arrive at consensus, a formal vote is rarely taken.

The four major committees, which also meet about every two months, are:

1. the School Committee, concerned with primary, secondary, and vocational education;
2. the Committee for Higher Education, concerned with universities and other post-secondary institutions;
3. the Committee for the Arts and for Adult Education; and,
4. the Committee for German Schools Abroad (*Schaubild*, 1973).

The committees deal with items arising from the deliberations of the plenary Assembly and proposals submitted by the provinces. Much of the committee work is assigned to sub-committees, ad hoc committees, and "working groups" (Arbeitsgruppen). The exchange of ideas and general discussion itself are held to be profitable and formal agreements are not necessarily expected.

The Secretariat, under the direction of the secretary-general, arranges for more than forty Assembly and committee meetings during the year. It provides for the essential contacts with the federal authorities and supra-provincial institutions. It offers a documentation and information service, is the contact with organizations such as OECD and UNESCO, and appoints representatives to international conferences (*Aus der Arbeit*, 1971, pp. 14-16).

The CMEC organizational structure is similar to that of the KMK. Three of the BRD provinces have two ministries for education and cultural affairs and each have two members in the KMK. Similarly, some of the Canadian provinces have created new departments to deal with post-secondary education and hence have two representatives on the CMEC. Whereas all of the West German territory, including West Berlin, is represented at the KMK, the northern Canadian territories, still largely under the jurisdiction of the federal government, have no representation at the CMEC at all. Though the territorial Departments of Education have asked to be permitted to participate as observers, the inter-provincial Council has not yet found this to be a feasible arrangement (Demisch, 1974).

The CMEC meets about three times a year. The management of the Council's business during the year is under an executive of five members who represent the five principal regions of Canada (Atlantic provinces, Quebec, Ontario, the Western provinces and British Columbia). An Advisory Committee of Deputy Ministers, established in September, 1972, meets prior to each CMEC meeting in order to prepare the agenda for the ministers. About half of the agenda items are generated within the Secretariat itself. The first chairman of the Council was W. G. Davis, at the time Minister of Education for Ontario. Currently, Francois Cloutier, Minister of Education for Quebec, is chairman.

The CMEC Secretariat, under the direction of a Secretary-General, carries out functions which are very similar to that of the Secretariat of the KMK. Under its supervision most of the activities of the CMEC are carried out by committees consisting of senior officials from departments of education. Each province is represented on each major committee. Some of the committees have been disbanded after their mandate was completed. For example, a **task force** was created to handle any special problems in the field of media following the completed work of the Instructional Media Committee (1968-73). The Manpower Programs Committee, established in 1968, was dissolved in 1972 after it had completed its report on the formulation of a policy position on manpower training. Similarly, the Post-Secondary Education Committee has been dissolved upon completion of its report on the financing of post-secondary education in Canada. Committees presently working are:

1. the Bursary Committee (which first met in 1971), to administer a summer language bursary program funded by the Secretary of State;
2. the Curriculum Committee (established in 1969), co-ordinating the participation of provincial departments in curriculum matters;
3. the Interprovincial Second Language Teaching Assistant Program Committee (1973), administering a program promoting bilingualism and biculturalism;

4. the Media Programming Committee (1973), consisting of a French and an English section, coordinates the programming of the Canadian School Broadcasts;
5. the OECD Review Coordinating Committee (1973), coordinating a review of educational policies in Canada in cooperation with the Organization for Economic Co-operation and Development, provincial departments, and the federal government; and,
6. the Statistics Committee (established 1971), facilitating an exchange of statistical information and the organization and planning of future statistical studies.

In addition to these committees, several task forces have been operating in areas such as federal involvement in research and participation in international education events. Representation on task forces may be regional rather than provincial (*General Information*, 1974).

It is apparent that the CMEC, still a young organization, has not yet developed or established a relatively permanent structure of committees, as has the KMK. In contrast, its committees have been assigned delimited tasks and dissolved upon completion of these assignments. New committees are created to attend to new jobs.

Powers and Influence

The accomplishments of the respective Councils must be seen in the context of the power and influence they can exercise. In both countries the control of education is a prerogative of the provincial legislature. However, this is no longer absolute in the BRD since the 1969 amendment, nor has this been absolute in practice in Canada, where, for example, the federal government for quite some time has been involved in post-secondary education. Nevertheless, neither the KMK nor the CMEC can enforce any decisions upon the provinces.

In contrast to the CMEC, the KMK has been able to achieve a considerable number of agreements. By 1971, when a total of 143 meetings of the Plenary Assembly had been held, more than 500 substantive decisions and agreements had been achieved. An agreement is accepted as "binding" only if all eleven members of the KMK are in accord with the decision. A surprisingly large number of consensus decisions are achieved, though many of these are the result of years of consideration and discussion (*Aus der Arbeit*, 1971, p. 7).

In contrast to the Canadian setting, some important differences can be noted which explain, in part, why the KMK has been successful in recording an impressive list of achievements. Tradition is valued more in Germany than in Canada. Also there is more agreement with respect to general learning theory and the establishment of order and regulations. There is a greater tendency to codify relationships. A major degree of centralization in educational direction was realized under Bismarck's rule in the years following 1871 when the province of Prussia assumed a major leadership role in educational matters. Under Hitler all authority and direction in education was preempted by the national government. Historically, then, there has been a stronger inclination, by desire or practice, to look to central government agencies for the solution of problems. Since the end of

the World War, West German unity has been encouraged also by a perceived threat along its eastern boundaries. Hence there is also a tendency to work towards decisions which will affect educational matters within all provinces as well as at the federal level. Furthermore, the current provincial boundaries are, in part, those established by the occupying powers. This event also caused some reduction of loyalty to the provinces and helped pave the way for the federal government to gain in influence and power.

The Canadian parliament does not easily arrive at agreement with respect to making amendments to the federal constitution. As the constitution of the BRD was, at least, in part, imposed by the occupation powers, there is less reluctance to agree to its amendment. In fact, it has been amended every year since 1949. Furthermore, even though a considerable proportion of Germans gain proficiency in one or more foreign languages, there is only one official language. Detailed agreements are less likely to be achieved in a country committed to bilingual and bicultural goals and having a population representing a multicultural and multinational heritage.

Geography is another significant factor affecting educational variations in the two countries. The BRD has an area approximately that of Alberta, but about thirty times its population. Within a few hours representatives of committees can arrive in Bonn. Many of the members are able to catch an early morning train, attend an all-day meeting, and conveniently return home that same evening. Meetings involving Canadian, or even regional representation, are costly in time and money, and hence are not likely to be called as frequently as those in the BRD. However, Canada's vast expanse also is associated with regional educational needs and goals which tend to vary more than those of the German provinces.

The KMK has been a participant in the establishment of dozens of supra-provincial educational agencies and organizations with which it maintains active communication. Its influence is considerable at both inter-provincial and federal levels (*Handbuch*, 1971, pp. 35-40). For example, each minister of education, in addition to being a member of the legislature of his own province, is an active member of several significant bodies. Firstly, he is a member of the KMK. Secondly, the KMK also comprises the Federal Committee on Educational and Cultural Matters, and as such he automatically is a member of the Federal Council (Bundesrat) which must give approval to all acts of the federal parliament which in any way directly affect the provinces. Thirdly, the ministers of education also comprise eleven of the seventeen seats on the governing commission of the Federal Council for Higher Education and Research (Wissenschaftsrat) which must give approval to the recommendations of the research commission of that same Council. Furthermore, the ministers also comprise 11 of the 18 members of the government commission of the German Education Council and examine and make decisions with respect to the recommendations of the education commission of that same council (Wernecke, 1970, p. 191). The KMK maintains an active contact with about fifty interprovincial, supra-provincial and federal organizations which have a predominant interest in some aspect of education (*Handbuch*, 1971, pp. 40-44).

By contrast, the CMEC has, as yet, more limited channels of com-

munication with other agencies. Its major federal contact appears to have been with the Department of the Secretary of State and with organizations reporting to the Secretary of State, such as the Canadian Broadcasting Corporation, The National Film Board, and the Canadian Radio and Television Commission. Other contacts include the Canadian Commission for UNESCO, the Canadian International Development Agency, the Commissioner of Official Languages, Communications Canada, the Department of Indian and Northern Affairs, the Department of Industry, Trade and Commerce, the Department of External Affairs, the Department of Manpower and Immigration, and the Department of National Health and Welfare (*Annual Report*, 1973).

It is perhaps surprising that little or no formal contact has been made with the departments of education for the northern territories. Also, very little communication to date has been achieved with such national organizations as the Canadian Teachers' Federation, the Canadian School Trustees' Association, the Association of Universities and Colleges of Canada, and the Canadian Society for the Study of Education. Even more surprising is the apparent lack of any definitive formal or informal relationship with the Canadian Education Association, the body which gave birth to the Standing Committee of Ministers of Education in 1960. Many of the CMEC concerns appear to overlap at least some of the concerns of the CEA (Macpherson, Goble, Whitney, Mackay, Coutts, Stewart, 1974).

The Council and its committees, by intention, are an internal communications structure for liaison among the Ministers (Demisch, 1974). There appears to be no mechanism for utterance to the public or for receipt of messages from the outside. Cloutier (1974), Chairman of the Council, has indicated that the Council has purposely remained "aloof" during its formative years and that it has not yet developed an "official stance" towards professional and other associations. He has stated, however, that the Council can no longer remain in political isolation and that the time has come for it to adopt a more open policy with respect to such communication. The Canadian School Trustees' Association, for example, has expressed its disappointment in not being able to communicate satisfactorily with the Council, and, as a consequence, has expressed its determination to develop its own national and provincial influence patterns (Whitney, 1974).

Achievements

As the KMK has been at work for a quarter of a century, its achievements are manifold and numerous. Only a few examples need be given. Its products may be classified as agreements, recommendations, acceptance or recognition of decisions made elsewhere, and position papers. The KMK has achieved agreement on such matters as certification of teachers, the inter-provincial mobility of teachers, the condition under which professors are engaged, inter-provincial recognition of matriculation and other school-leaving certificates, the establishment of the dates for school holidays, the years when second and third language instruction might begin, the definition of school grades and standards, acceptable language usage, and even the prescription of the format of pupil exercise

writing books. It has developed guidelines for the content of courses, the examination of graduate students in universities, and the education of the children of foreign workers in Germany. It has been instrumental, or participated in the establishment of national or federal agencies such as the Max-Planck-Institute for Educational Research, the Research Council (Wissenschaftsrat), the German Education Council (Deutscher Bildungsrat), the Federal-State Commission for Educational Planning (Bund-Länder-Kommission für Bildungsplanung), and the Federal State Planning Committee for the Development of Universities (Bund-Länder Planungsausschuss für den Hochschulbau). It has assisted in the establishment of institutes for the production of educational films, and radio and television instruction. It has been involved in the work of international organizations such as UNESCO and OCED (*Handbuch*, 1971).

The Annual Report of the Secretary General of the Council of Ministers of Education (Canada) for 1972-73 lists a number of significant achievements. The CMEC arranged for international educational tours and for participation at international conferences such as that of the UNESCO and the OECD Conference on Future Structures of Post-Secondary Education held in Paris. It is participating in a review of educational policies in Canada in cooperation with OECD. A report was prepared on early childhood education in Canada for presentation to a Conference in Paris, another on recent innovations in teacher training programs in Canada to a conference in Nairobi, and a third on the organization of education in Canada for presentation in Geneva. Information on other educational matters were prepared for education ministries in Chile and in Natal. Certainly the CEMC has made its mark on the international scene.

For the first time the provinces had formulated consensus positions on educational matters such as those related to manpower programs, foreign students, and student aid, for presentation to the federal authorities. Also, for the first time a joint meeting of ministers of education and of finance was held and a task force was established to prepare a report on the financing of post-secondary education. An inter-provincial second language teaching assistant program was initiated. A report on a seminar on Transmission of Technology for Education was published. Negotiations were instigated with the National Film Board regarding cooperation at the inter-provincial level. In cooperation with the Education Division of Statistics Canada, a study was initiated to establish a greater degree of comparability of statistics within provinces and interprovincially, and also for improved procedures for the collection of data. Within the Curriculum Committee attention was directed to metric conversion, inter-provincial transfers, Canadian studies, and environmental education. On the other hand, when a province brought forward a proposal regarding multiculturalism, the decision reached was that the matter be the concern of individual provinces only, and not that of the Council.

Cloutier (1974) has claimed that in February of 1973 the provinces had been able to negotiate collectively with the federal government on important matters for the first time. He stated that the Council was on the verge of formal agreement with the Federal Department of External Affairs regarding the Council's role in international educational events. Further,

the desire of the provinces to be consulted regarding federal funding of university research was now under discussion at a committee level involving civil servants of provincial governments and federal representatives as observers. For 1974 the Council operates programs funded by four million federal dollars. Its budget exceeds a half million dollars.

The foregoing list is not complete. The Advisory Committee of Deputy Ministers at its meeting in May, 1974, dealt with some fifty items (Lorimer, 1974). However, what is reported here would appear to substantiate some general achievements brought about through the structures of the CMEC, which the latter lists in its 1974 general information pamphlet:

1. It provides duplication of facilities already existing at the provincial level.
2. It ensures a more efficient use of the scarce supply of specialized staff.
3. It ensures that the on-going work of the Council is closely coordinated with the various provincial programs.
4. It develops a climate of mutual confidence among the staffs from all provinces through the close working relationships.
5. It ensures continuity and coordination of programs and makes quick and concerted action possible when events require it (p. 3).

Replies from Deputy Ministers from all of the provinces and from some of the Directors provided examples to support the statements issued by the CMEC Secretariat.

It is not the purpose of this paper to outline the invaluable contribution of the CEA to Canadian education over the course of many decades. One example illustrating how it served to fill the gap prior to the establishment of the CMEC was given by H. T. Coutts in his presidential address in 1966:

Because Canada has no federal office to speak for education, the Department of External Affairs, when asked to deal with educational matters having national implications or international dimensions, frequently turns to the CEA as a voluntary association sponsored in large measure, and certainly financially, by provincial Departments of Education. It has become customary, for example, for the CEA to provide liaison between the Department of External Affairs and the Canadian National Commission for UNESCO on the one hand and the Departments of Education of the various provinces on the other. As a result the Association has been asked annually by the Department of External Affairs to name two delegates to the meeting of the International Conference on Public Education in Geneva and frequently to nominate candidates to attend a number of other important meetings (p. 33).

Conclusion

In its early stages the KMK was much concerned with the reconstruction of German school systems following the war, with the establishment of order and structure, comparative standards, and a degree of uniformity among the provincial school systems. The German inclination to grant authority and powers to centralized organizations and government agencies made possible a considerable measure of agreement to be achieved at the inter-provincial level through the KMK. Over time the KMK appears to have exercised more of its energies in the initiation of plans leading to the establishment of supra-provincial bodies which have affected educational development at the federal as well as the provincial levels. In more recent years the KMK has given considerable attention to matters related to

educational planning, innovations in educational programs, and to trends in educational reform in German education. Though the KMK continues to utter its support for the principle of provincial autonomy in educational matters, collectively the ministers of education, through the KMK, exhibit statesmanlike qualities in attempting to achieve the best interests of all citizens in all provinces. It would appear that its influence at the federal and international levels will continue to increase, without suffering any loss of its impact on provincial and inter-provincial developments in education.

Though the CMEC has progressed beyond its early formative stage, apparently it has not yet established a mature identity. This is evidenced in part by its meagre communication with non-governmental agencies and its lack of formal contact with education departments in the territories, even though its terms of reference may not officially include a concern for them. A major effort appears to be expended in making an impact on departments of the federal government. Considerable progress has been made in the exchange of information and development of ideas in areas of mutual educational concern among provincial authorities.

The cultural and political contact within Canadian provinces as well as at the national level differs considerably from that in the BRD. Hence, the CMEC will serve a somewhat different set of objectives, or at least serve these in a different manner from that of the KMK. Presently the CMEC has to work through several federal departments of government. Is it possible that through the work of the CMEC eventually sufficient confidence and trust is generated at the inter-provincial and federal levels, which would permit greater coordination at the federal level through the establishment of a federal agency of ministry or education? Provincial autonomy need be threatened no more than has the establishment of a federal ministry of education in the BRD. However, there are factors other than those related to education which would bear upon the consideration of such a decision. Cloutier (1974) contends that a new pattern of federalism may develop which takes greater account of regional disparities and cultural and linguistic differences. He suggests that inter-provincial councils in fields other than education could be established. The BRD has such councils of ministers in several areas of endeavor.

Whether a federal ministry is ever established or not may be immaterial to the contribution the CMEC is able to make in the years to come at the provincial, the inter-provincial, the federal, and the international levels. Whereas the German tradition usually determines that constitutional and regulatory amendments precede changes in practice, the Canadian context requires a more flexible arrangement which allows new practices to evolve without altering the constitutional framework.

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Semantic Space and the Development of Word Meaning

From cumulative experiences which focus attention on the many ways in which words can have meaning, on the many logico-semantic relations between words and their significates, each person builds a unique multi-dimensional meaning space. New words are processed in terms of the dimensions existing in the individual's meaning space. Development of verbal ability, therefore, should involve learning of ways of knowing concepts rather than learning words as undifferentiated entities, and these semantic associations should be organized into broader strategies of perceiving meaning to reduce the information processing load. (Dr. Evanechko and Dr. Armstrong are Associate Professors in the Faculty of Education, University of Victoria; Dr. McFetridge is Professor of Elementary Education, University of Alberta.)

Introduction

The problem of word meaning is as old as language but until recently has remained in the hands of philosophers and logicians. Since the turn of the century, though, psychologists and educators have focused serious attention upon the problem, for both academic and practical reasons. In this respect, the present paper was an attempt to look upon meaning as a process occurring within the individual's cognitive functioning.

The intimate relation of vocabulary to the thought process has long been recognized:

... a person's construction of semantic concepts necessarily involves a number of psychological processes, e.g., perception, symbolization, and abstract thinking. It is also influenced by personal experience, social customs and cultural values (Fischer, 1966, p. 24).

Church, therefore, suggests that:

... one comes to terms with reality only through a continuing dialectic in which language plays an intimate and indispensable role, and which orients us

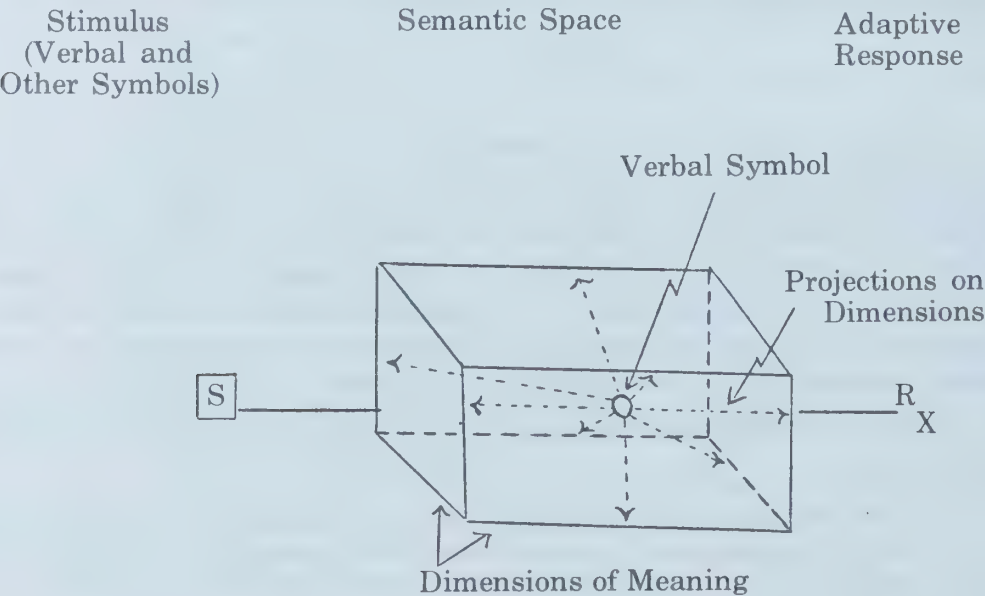
schematically to a multidimensional universe infinitely broader and more variegated than anything that can be known perceptually and at first hand (Church, 1961, p. 136).

Word meaning, therefore, has come to be considered the result of the active encounter of thinking individuals with reality where the organism mediates verbal sensory data in order to ascribe meaning to it. Such “interpretative” behavior by individuals has given rise to verbal mediation theories of meaning and resulted in the development of instruments, such as the *Semantic Differential* (Osgood *et al.*, 1957), designed to measure the underlying psychological processes. Taking the position that meaning depends upon the relations between symbol and referent, associationists have sought to establish the number and strength of associations between words as measures of meaning (Creelman, 1966, p. 130). In either case it is held that the individual “learns” certain responses. Meaning, therefore, can be considered both a process and a product variable resulting from the organism’s behavior in interpreting environmental stimuli.

Semantic Space

The mediational view of meaning suggests a relatively unique kind of semantic organization underlying each individual’s verbal behavior. For purposes of analysis and discussion this organization might be considered to comprise a multidimensional semantic space which serves to process words for the individual. The quotations from Fischer and Church above allude to this position and Osgood (1957) has used this approach in examining the connotative meanings of words. Schematically (Figure 1) the above position might be illustrated thus:

FIGURE 1
MODEL OF ASSUMED RELATION OF SEMANTIC SPACE TO VERBAL STIMULI



According to the position taken by the writers, an individual makes adaptive responses (overt or covert) R_x to verbal stimuli on the basis of what these stimuli “mean”. Meaning accrues to the symbol when it is placed in the individual’s semantic space and, therefore, depends upon the

dimensions which constitute this space. The dimensions, comprised of logico-semantic relations, *i.e.*, the way meanings of words can vary, become conditioned behaviors resulting from the individual's learning history. In other words, the individual learns that words can stand for different dimensions of relevance of environmental data, *e.g.*, physical attributes, logical relations, spatial relations, use, *etc.* Particular words, of course, draw upon only certain dimensions for meaning. The symbol, therefore, when it impinges upon this space, results in projections upon certain of the dimensions which define the space. The nature of the dimensions is thus a determiner of the quality of the meaning of the concept for which the word is a symbol and consequently a determiner of the meaning of the word. Dimensions of meaning will vary with experience, quality of intellectual functioning, and other meaning-related variables and it is assumed that the lack of certain of these dimensions necessarily denotes an inability on the part of the individual to perceive certain qualities of meaning.

Individual differences will condition the quality, the availability and may even determine the existence of the various dimensions of meaning. The dimensions will, logically, vary in terms of the difficulty of the cognitive process required for the development of the dimension. For example, a category of meaning achieved through analysis will be inherently more difficult than a dimension built upon contiguity and will, consequently, be used effectively by a more intelligent individual. Further, just as a lumberman examines a tree using different criteria from those used by a landscape gardener and different again from the criteria used by an artist, the total experiential and affective background of each individual will help to shape the geography of his semantic space.

Semantic space, as a hypothetical construct, might, therefore, be defined as an *n*-dimensional space which identifies and defines the individual's verbal mediating responses and describes the process or strategy applied by this individual in assigning meaning to verbal data. This space may be considered to be Euclidean in nature, possessing a varying number of orthogonal dimensions. These dimensions define the limits of this space and are the kinds of logico-semantic relations the individual can conceptualize as existing among sensory data and linguistic symbols or among linguistic symbols themselves.

Dimensions of Meaning

The Orienting Reaction

It will be noted that the above position suggests an active role for the organism in processing verbal stimuli. Thus it was stated earlier that meaning considered from this perspective is a process variable. The dimensions postulated to define semantic space are the orientations or sets the individual develops in the course of his verbal learning history. Lynn sees such orientations as introspective attention reactions,

... the orientation reaction, including orientation towards the stimulus for the purpose of further investigation. Here it is a learned response and is elicited by stimuli which are familiar but whose meaning is still to some extent uncertain (Lynn, 1966, p. 9).

These dimensions or orienting reactions are fewer in number than the

totality of the ways in which words can vary in meaning since the tendency in human psychological behavior is towards the reduction of complexity in interpreting environmental data. In other words, the individual becomes conditioned to look for certain kinds of relationships between words and their significates. This searching or hunting is the process of word meaning retrieval and may be supposed to be enabled by the orienting reaction postulated by both Soviet and American psychologists (Berlyne, 1965). This is essentially the position the present writers adopt in explaining the process of signification, i.e., the manner by which the dimensions of an individual's meaning space determine the qualities of meanings of words and concepts. Perhaps the most succinct and lucid expression of this notion is presented by Zaporozhets.

Despite all the differences between orienting responses in sensation and in thought, they are united by a similarity of function and a genetic relationship. It can be assumed that the physiological mechanism of inner, covert orienting responses is prepared in the process of external, overt orientation. During an inner, ideational search, a focus of optimal excitation, like the beam of a searchlight, "rummages" through the cerebral cortex, seeking and reviewing those traces of past experiences that have a more or less close relation to the problem being solved by the subject at the present moment. This search has a selective character and is, in accordance with the circumstances, invariably directed into a definite channel, a particular itinerary, by the cues of inner speech. But how is this channel formed, how is this itinerary put together, through which internal, verbally controlled attention moves?

It is evidently put together in the first instance by the process of external, sensory attention, by the process of external overt orienting activity, aimed at the investigation of real, immediately perceived objects and situations. In coming up against their objective properties, the orienting response changes its form by a conditioning process and adopts an itinerary determined by them. And this itinerary, which is "traced out" in the cerebral cortex by movements of the sensory equipment and corresponds to the properties and interrelations of objects that have been inspected, is likewise followed by the inner search when a subject is concerned not with real objects but with objects that he is representing to himself and thinking about (Berlyne, 1965, p. 112).

The orientation reaction, long interpreted in physiological terms, has of late been finding a more central role in psychological theory, e.g., theories of personality (Eysenck in Lynn, 1966, p. vii). There is general agreement that through the orienting reaction, the organism alerts itself to deal with the possible eventualities which the incoming stimuli may herald.

In man this reflex has been greatly developed with far reaching results, being represented in its highest form by inquisitiveness—the parent of that scientific method through which we hope one day to come to true orientation in knowledge of the world around us (Pavlov in Lynn, 1966, p. 1).

Lynn (1966) has classified the components of the orientation reaction into five categories. The purpose of these physiological changes, in general terms, is to make the organism more sensitive to incoming stimuli. Sokolov (in Brazier, 1960) and Gastaut (in Jasper, 1957) distinguish two varieties of orientation reaction. The generalized orientation reaction is elicited first and involves arousal over the whole cerebral cortex. The localized orientation reaction is confined to the cortical area of the particular sensory modality. These varieties are believed to depend in part upon the state of the subject. Furthermore, these components of the orientation reaction do not necessarily occur in all subjects, there being individual differences. The

variations in physiological and neurological orientations were, therefore, considered to result in a different representation of stimuli. This representation would then constitute the meaning of the stimuli.

The orientation reaction involves other responses made to novel stimuli. "Two other (related) responses are possible, namely adaptive and defensive reactions" (Lynn, 1966, p. 6). Adaptive reactions operate to preserve equilibrium, i.e., provide negative feedback while the orientation reaction increases sensitivity to stimulation. Also, the adaptive response does not habituate with repeated stimulation. These characteristics of the adaptive reaction would make the individual note the familiar and recognizable qualities of stimuli to maintain equilibrium in perception of these stimuli. Defensive reactions (startle reactions) involve, in general, physiological reactions which mobilize the individual for efficient action. These constitute the "primary attention" reaction. "Secondary attention" reaction, or introspective attention, is

... the orientation reaction including orientation towards the stimulus for the purpose of further investigation. Here it is a learned response and is elicited by stimuli which are familiar but whose meaning is still to some extent uncertain (Lynn, 1966, p. 9).

For example, a geologist and non-geologist pass by a rock. The non-geologist does not notice it, but the geologist immediately sees and investigates it. Secondary or introspective attention appears to be that component of semantic behavior which orients the individual to certain dimensions of relevance of stimuli learned through experience.

Berlyne (1960) has distinguished seven kinds of situations evoking orientation reactions. These were reduced to three by Lynn (1966, p. 13). The first is novelty—where something is novel about the stimuli. The second involves conflict—where orientation reactions are made to positive and negative stimuli until discrimination becomes perfect. The third type of stimulus involves conditioning. Grastyan (in Brazier, 1961) has shown that the orientation reaction may be best regarded as a conditioned reaction. First, he argues that the orientation reaction only appears after several applications of the stimulus. Second, he states that the orientation reaction can easily be habituated, therefore, it resembles conditioned rather than unconditioned reactions. Third, the orientation reaction is absent in infancy and emerges only after learning has occurred. The notion that the orienting reaction is a conditioned response has powerful implications for meaning. It suggests that the individual learns new dimensions of relevance of, or ways of orienting himself to, stimuli and that meaning is ascribed to stimuli on the basis of the representations he has of these stimuli.

Vygotsky, Buhler and Gatzert [in Cole & Maltzman (Eds.), 1969, p. 144] contend that language learning begins with an orienting reaction to words but that at first it is not the lexical quality of the word but the simple novel stimulus effect that is the controlling one. They go on to say that gradual discrimination of verbal signals from the remaining components of the situation occurs and the original orientation reaction initiates a conditioned response to words. The child's speech, they conclude, then becomes a means of orienting himself to a new situation and of organizing and mobilizing previous experience.

Ruzskaya [in Cole & Maltzman (Eds.), 1969, p. 147] suggests that the role of words in the discrimination of objects increases as the discrimination becomes more subtle and Martsinovskaya [in Cole & Maltzman (Eds.), 1969, p. 179] contends that the orienting reaction comes to control overt action through the semantic component of words. Zaporozhets (in Cole & Maltzman, 1969, p. 184) concludes that capacity for complex activity according to verbal instruction is, therefore, related to change in orientation methods. Thus, the mastery of a word and its use alters the perception of an object. Words and concepts are assimilated according to orientations established toward them so that a child's orienting reactions determine what shall be discriminated in representing stimuli by words. The words the child learns and the orientations or semantic dimensions which direct his learning consequently restructure his sensory cognition of reality, i.e., determine the meaning of concepts for him.

The concept of orienting reactions or dimensions of meaning must also be considered within the context of intellectual development. The "Cumulative Learning Model," Gagné (1968), presents a view of learning and of cognitive development which the writers have accepted as descriptive of acquisition of the verbal behaviors considered in the semantic space model. Gagné expresses this position as follows:

In the latter instance the individual reacts, not only to the sound stimulus associated with the word producing a generalized response, but with an appropriate specific response in terms of the meaning, e.g., until a child learns the meaning of "yes" and "no" the uttering of either of these words results in a generalized response similar for both.

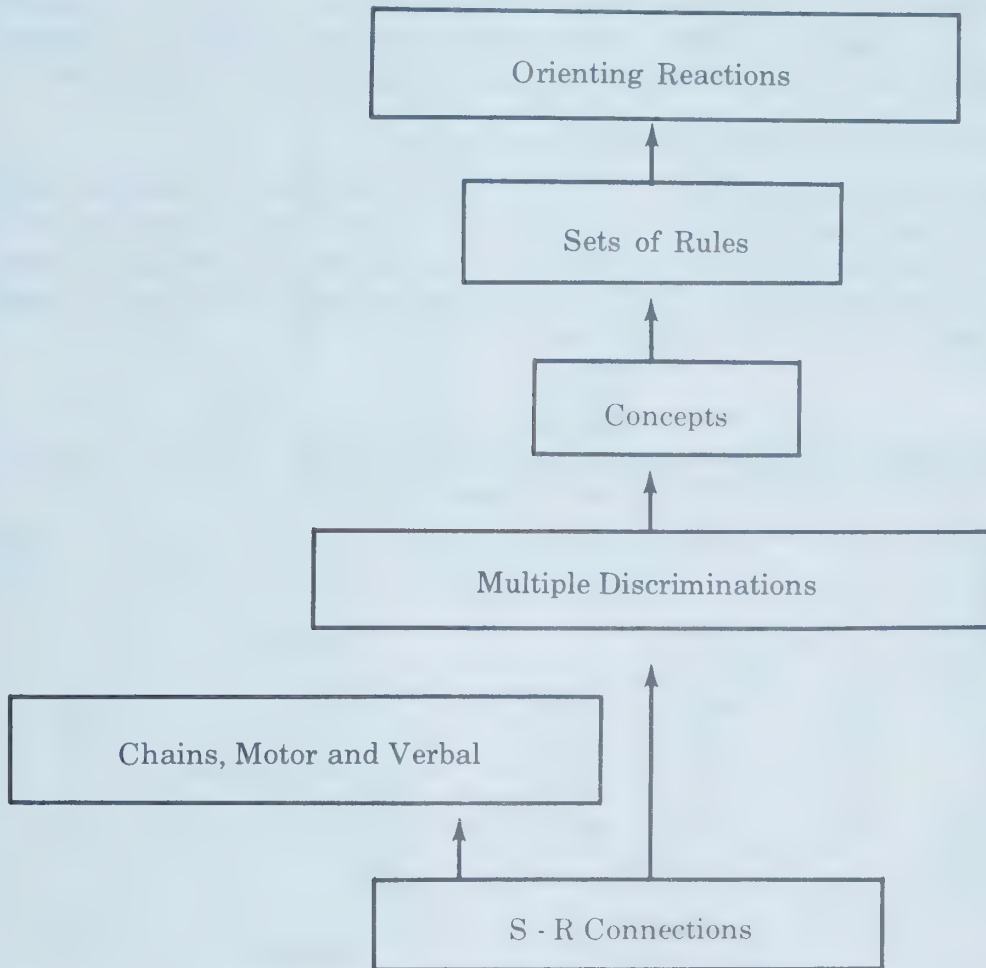
Intellectual development may be conceived as the building of increasingly complex and interacting structures of learned capabilities. The entities which are learned build upon each other in a cumulative fashion and transfer of learning occurs among them. The structures of capability so developed can interact with each other in patterns of great complexity, and thus generate an ever increasing intellectual competence. Each structure may also build upon itself through self-initiated thinking activity (Gagné, 1968, p. 190).

Cumulative Learning

Figure 2 illustrates this notion, i.e., that much of what is learned by the organism takes the form of sets of rules and orienting reactions. These are formed from simpler entities such as concepts. The learning of concepts, in a similar manner, depends upon certain prior discriminations such as those of extent, attribute, and relationship of objects or abstract entities. These in turn require prior learning chains "... particularly those which include verbal mediators. And finally these chains are put together from ... associations of 'S-R connections'" (Gagné, 1968, p. 182). The outcome of this sequence corresponds closely to the orienting reaction notion postulated by Berlyne (1965). Gagné concludes: "... 'rule' refers to what might be called the 'meaning' of ... a statement, and not to its verbal utterance" (Gagné, 1968, p. 182). These rules, ways of perceiving relationships such as synonymity or contrast among concepts or entities are activated and organized by the broader orientations that have been conditioned to environmental stimuli. These orientations may be considered to be the individual's dimensions of meaning.

Relating this model to the concept of semantic space provides one

FIGURE 2
MODEL OF A GENERAL SEQUENCE FOR CUMULATIVE LEARNING
(after Gagné, 1968, p. 182).



description of the manner in which dimensions of meaning, i.e., orientations or sets are formed from simpler entities such as the various categories of meaning which in turn result from direct associations between significates and symbols. The model also indicates that those individuals who have not learned certain of these lower-level relationships "... could not acquire a higher-level capability to which it was related" (Gagné, 1968, p. 183).

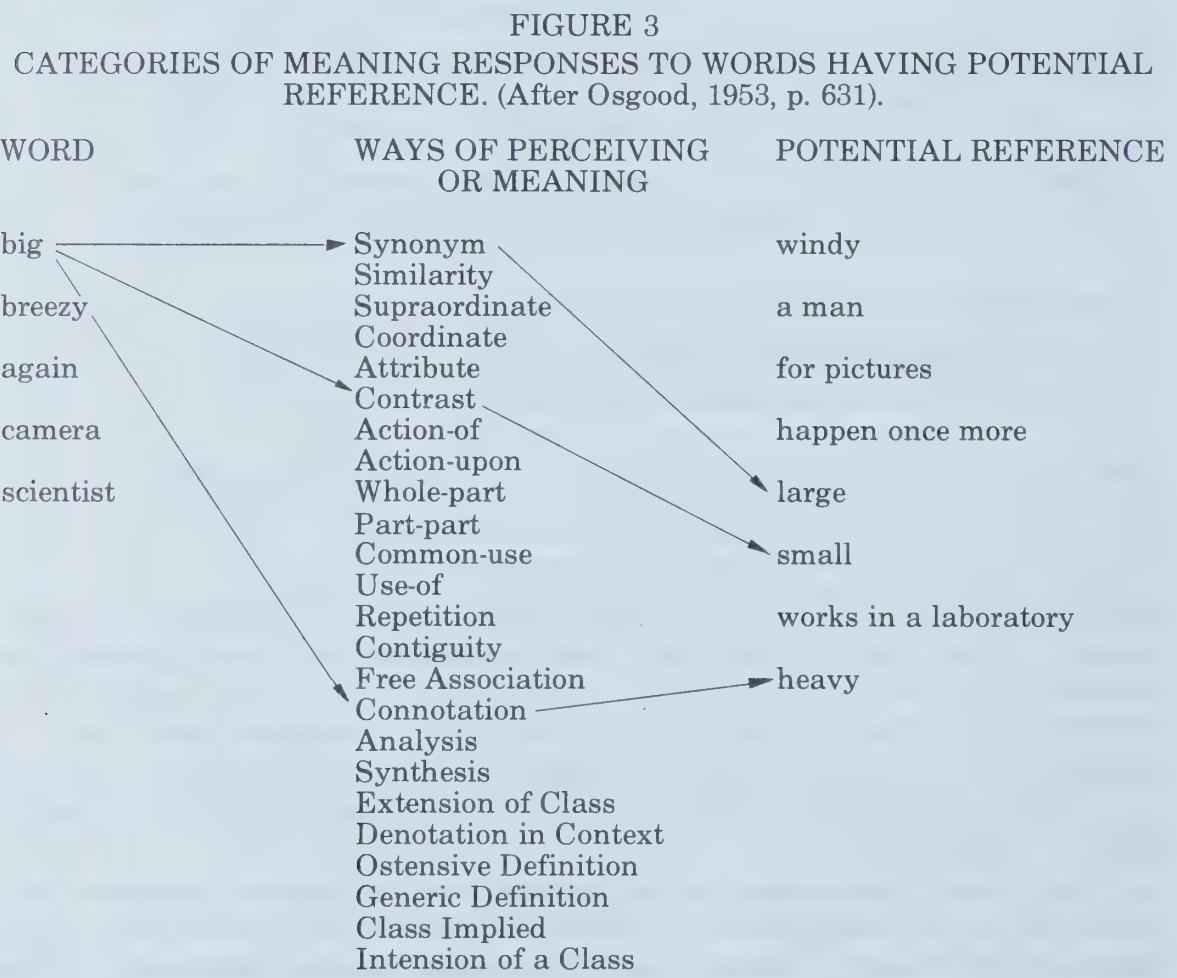
This type of cumulative learning provides for transfer or generality because of the occurrence of identical or similar elements (concepts or other learned relationships) within developmental sequences. Consequently, the same orienting reactions can be considered to apply in all instances of verbal behavior.

The "stage" of the learner or the quality of semantic space he possesses can be identified by describing his present capabilities and the capabilities he must acquire to make possible the ultimate or most adequate combination of subordinate semantic elements into the most productive "rules" and dimensions of meaning. In respect to "stage" theory, Gagné (1968, p. 189) contends stages of development are not related to age except in the sense that learning occurs in time. Similarly, they are not related to logical structures except in the sense that the organizing of prior relationships into new ones depends upon an inherent logic.

Thus, similar kinds of semantic space may be present regardless of the age of the individual. The ontogenetic effect upon intellectual functioning is not considered to be the sole or major influence in its development. Rather, it is assumed that cumulative learning within the context of maturation results in intellectual as well as linguistic development.

Measuring the Dimensions of Meaning Space

Operating upon the basis outlined above, it should be possible to identify the dimensions of individuals' meaning space. From these dimensions, one can infer the kinds of strategies or processes that underly meaning retrieval. The specific details of the construction and operation of a test for this purpose can be summarized as follows.

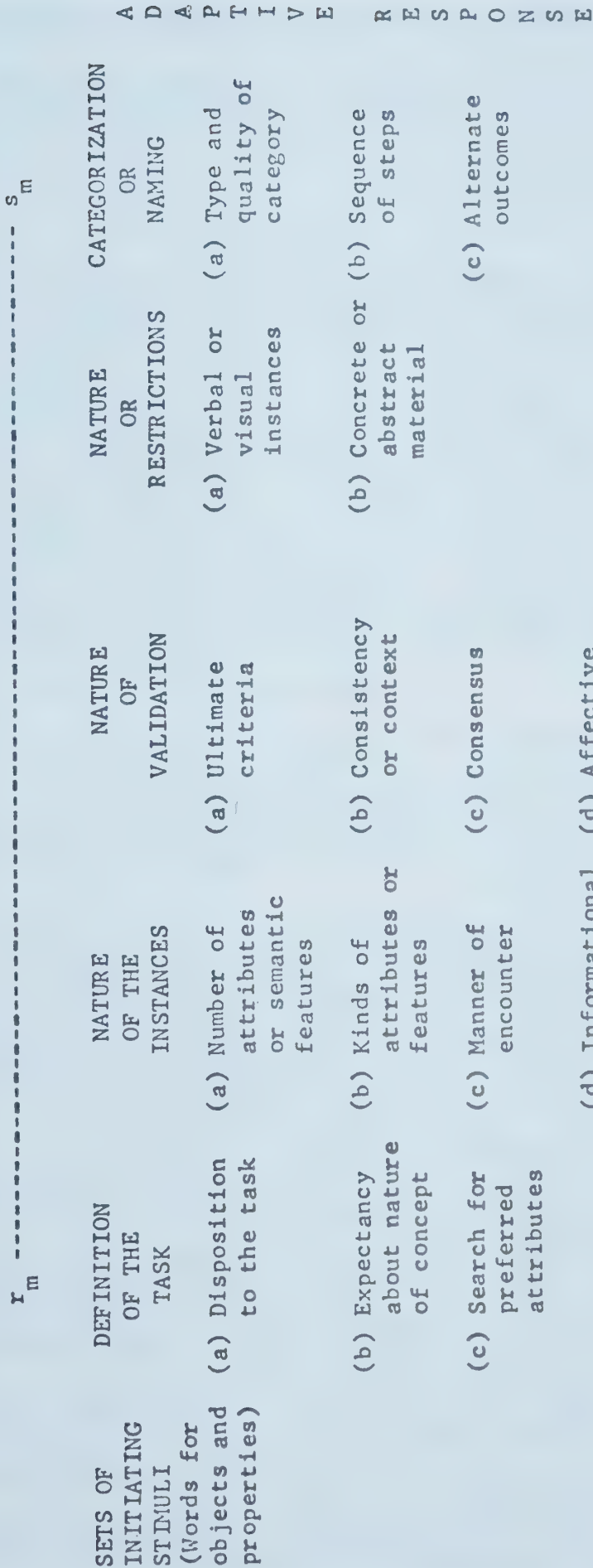


The basic model, Figure 3, suggests the nature of meaning responses (categories or discriminations) used in concept formation and word meaning retrieval . . . This model identifies the function of mediating responses in ascribing meaning to verbal stimuli. These mediating responses correspond to the observing response concept (Kurtz, 1955) and that of the orienting response (Berlyne, 1965) as already noted.

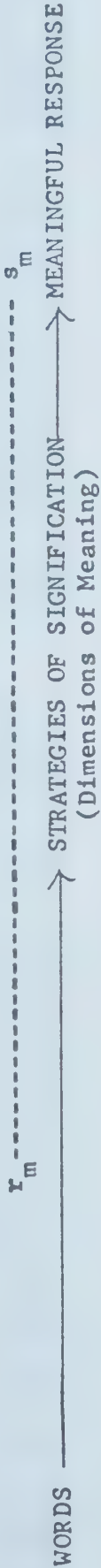
Figure 4 is a model representing the assumed relationship between the process of concept attainment and subsequent identification or signification of words. The concept attainment process, Figure 4A, as a mediating response, organizes words as sets of initiating stimuli into meaning bear-

FIGURE 4
MODEL OF THE ASSUMED RELATION BETWEEN CONCEPT ATTAINMENT, AND WORD MEANING RETRIEVAL.
(After Bruner, et al., 1962; Osgood et al., 1957).

A. CONCEPT ATTAINMENT



B. WORD MEANING RETRIEVAL



ing concepts through the identification of relevant dimensions and their subsequent categorization.

When a label has been ascribed to a concept, the word can come to elicit a particular meaningful response, Figure 4B, when the individual's strategies of signification or ways of perceiving meaning are applied at the representational mediation stage.

Summary

Word meaning is achieved through a process of locating the verbal symbol in the individual's semantic space. The dimensions of this space develop as a result of the individual's learning history. They constitute orienting responses to words and are comprised of categories of logico-semantic relations between words and significates. The categories of meaning develop, through a process of cumulative learning, a set of rules or responses to verbal stimuli which direct the individual to certain dimensions of relevance of environmental data and constitute the meaning of concepts. Meaning, therefore, is the result of a strategy employed in relating the word to kinds of semantic relations and a function of the cumulative learning history of the language user. The dimensions of meaning which comprise this strategy should be amenable to measurement.

Implications

Adequate vocabulary development must be based upon an appropriate model of instruction; thus the basic notions underlying this paper have implications for such an instructional program. Two major factors are: (a) the multidimensionality of meaning space and the processing of verbal stimuli by these dimensions, (b) the cumulative learning view of development of semantic competence.

The notion of multidimensionality of meaning should alter the task of vocabulary building and the nature of the intellectual functions of which the learner is capable. The processing (scanning, orienting reaction) concept has implications for verbal learning in that the goal of instruction will become one of developing strategies of manipulating concepts rather than teaching isolated words. This view will require the presence of a variety of organized experiences. The dimensions of meaning space which enable the individual to process stimuli orient him to certain relevant characteristics of these stimuli and are considered to be conditioned behaviours. They develop out of many simple associations to form "rules" (Gagné) or strategies (Bruner) for dealing with one's environment. Development in verbal ability should, therefore, involve the learning of ways of knowing concepts rather than learning words as undifferentiated entities. The notion of cumulative learning should result in more rigorous guidelines for selecting learning activities based on hierarchical components of meaning responses.

Conditioning new "ways of meaning" (semantic relations) to verbal stimuli should enable the individual to comprehend, i.e., solve the problem of the meaning of a word more easily. Since the materials the learner reads are not words, rather concepts represented by linguistic symbols, enriching the associations a symbol may take enriches concepts and makes perception and communication more adequate. These semantic associations should be

organized into broader strategies of perceiving meaning to reduce the information processing load. Thus, comprehension could be aided by developing such "anticipatory schema" or orienting reactions of imagery and language to help children orient themselves to relevant characteristics of concepts.

The quality of meaning available to the learner must be considered in terms of: (a) adequacy—the logical and representational characteristics of meaning, (b) level—the maturity of symbol-significate relationship. Identifying behaviors appropriate to development stages and situational factors would at once avoid having instructional materials go far beyond the learner's competence as well as provide a guide for sequential development of semantic ability.

Vocabulary development should occur through the natural learning sequence for language, i.e., listening, speaking, reading, writing. Training sessions in each mode of communication should include some analysis of the way in which verbal stimuli are processed by sender and receiver. For example, learners might be asked to determine the quality (depth and breadth—Russell, 1954) of meaning of words used by the speaker or writer by comparing them with the meanings they attribute to these words on the basis of categories of meaning. Learners should also practice expressing ideas they have encountered by choosing words which most adequately express the qualities of concepts perceived.

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Oral Language, Reading Ability, and Socioeconomic Background in Three Grade One Classes

The purpose of this investigation was to study the differences in oral language competence which exist in the "average" Canadian urban classroom. Using a sample of 81 English speaking Grade 1 students, cluster analysis was used to create three groups using seven measures of oral language competence. Group membership was highly predictive of reading proficiency measured at the end of Grade 2. Further, there is evidence to support a relationship between socioeconomic area of school location and oral language competence. (Dr. Rodgers is an Assistant Professor in the Language Arts Department; Dr. Slade holds the same rank in the Reading Department; Dr. Conry is an Assistant Professor in Educational Psychology.)

In the last ten years an increasing number of educational researchers have focussed their attention on children's oral language and its relationship to achievement in reading, and to socioeconomic background. Reviewing British research, Wilkinson (1969, p. 114) commented, "Oracy is the basis of literacy. There is little point in trying to teach children to read if they lack certain basic skills. We need remedial oracy rather than remedial reading classes." Among U.S. researchers Ruddell (1965) noted that "Reading comprehension is a function of the similarity of patterns of language structure in the reading materials to oral patterns of language structure used by children." Similarly, the link between oral language and socioeconomic background has been discussed extensively by the British sociologist Bernstein (1970) and by numerous American investigators, including Loban, who observed in 1966 that:

Those who have the advantage of good oral proficiency (and who come from favored socioeconomic circumstances) accelerate their reading ability as their schooling progresses. Those whose social background offers a limited linguistic start in school fall further behind as reading instruction continues.

In work with Canadian teachers, the authors have found an awareness of the problems facing immigrant children from non-English speaking

families, and an acknowledgement of the language problems of some native Indian children. However, many teachers were reluctant to accept the notion that socioeconomic background influences the academic performance of "ordinary" Canadian children, and there is little appreciation of the fact that differences in oral language competence exist in the "average" urban classroom.

Accordingly, the primary objective of the present investigators was to confirm whether or not British and American findings applied to Canadian urban children beginning Grade 1. Do such children differ significantly among themselves in oral expressive language? Is their language competence related to later reading achievement? Is socioeconomic background related to their language and/or reading achievement?

The study also sought, through the measures employed, to explore further the nature of competence/non-competence in oral expressive language.

Areas examined and measures used

Fluency

The most widely used measure of oral competence is fluency of utterance in response to pictures or other stimuli. Thus Loban reported both the total number of words uttered and also the average number of words per communication unit. (The latter corresponds to an independent clause.) The stimulus situations in the present study consisted of:

- (1) A description of what was happening in a picture. Shown a circus scene of a lion escaping from a cage (Peabody Language Development Kit, Story Card 4) the child was asked what he saw and thought about the situation (procedure patterned on Loban, 1963).
- (2) A retelling of a familiar story. The child was asked to tell from memory the story of *The Three Bears* (procedure patterned on de Hirsch, Jansky & Langford, 1966).

Fluency scores derived from these situations consist of the *Circus Total*—the total number of words spoken in response to the picture; and, *The Three Bears*—the number of words uttered in retelling the story.

Vocabulary

Clearly the range of words available to the child and the richness of the concepts underlying them are important elements of expressive language ability. Three types of vocabulary measure were employed in this study:

- (1) A standardized vocabulary test. The vocabulary sub-test of the *Lorge-Thorndike Intelligence Test* was used. This requires the child to identify pictured objects, actions, or situations, in response to spoken directions.
- (2) A range of vocabulary count. This was derived from the child's response to the circus picture.
- (3) A definitions test. The child was asked to give his meanings for common words. In three practice trials it was pointed out to the child that an object (e.g. a wrist-watch) could be described in terms of what it *looked* like, what it was *used* for, and what *kind* of thing it was (i.e. its class). The child was then asked "What can you tell me about (an apple)?" This pattern was followed for twenty common concepts. The responses were later analyzed and the units of information in the child's responses categorized as being descriptive, functional, or classificatory in nature. Although the measure is an

original one, the classification of definitions in this way is a well-known procedure. See, for example, the *Stanford-Binet Test*.

Vocabulary scores derived from these situations consist of the *Vocabulary Standard*—the standardized test score; the *Vocabulary Range*—the number of different words (types) used in response to the circus picture; *Vocab. Information Units*—the total of items of relevant information included in the twenty definitions given by each child; *Vocab. Descriptive Units*—the total of descriptive items in the definitions; *Vocab. Function Units*—the total of function-related items in the definitions given. (Thus a definition stating “An apple is sweet; you eat it,” has two Vocabulary Information Units: one Vocab. Descriptive Unit and one Vocab. Function Unit. Other forms of definition—by class, by example—occurred too infrequently to be represented separately.)

Connectives

Coherence—or its lack—is one indicator of language competence. Several investigators (Robertson, 1968; Bernstein, 1971; Rodgers, 1974) have noted that children appear to differ in the range of connectives (however, although, because) which they use or respond to. This study employed:

A twenty item sentence completion test. Given the first part of a sentence (which began or ended with a connective), the child supplied (orally) an appropriate ending. Example: “If the wind blows very hard . . .” (an original test; procedure patterned on Watts, 1944).

The *Connectives* score refers to the number of sentence-completions made by the child, which indicated he had understood the connective given.

Reading

At the end of Grade Two, schools administered the *Cooperative Primary Tests* (1967) which yielded scores for Listening, Word Analysis, and Reading Comprehension.

Selection of the Sample

The policy of the Vancouver School Board did not permit the gathering of socioeconomic data on specific families. However, on the basis of a 1961 urban census (Bell, 1965) the School Board could identify specific socioeconomic areas of the city. From such areas three schools were selected by the Board as representing, respectively, high, middle, or low-income populations.

From each school 35 grade one children—intact classes initially—were randomly selected by the investigators. The children’s home language was typically English, and no child was accepted whose health record suggested any problem likely to affect language development.

From each class of 35 children 9 were randomly assigned to each of three interviewers, who thus had 27 children each for a total sample of 81 (49 girls, 32 boys).

Procedure

The reading and standardized vocabulary tests were given to classes; all other measures were administered individually in the school attended by

the child. All tests and interviews with a particular child were conducted by his allotted interviewer, tape-recorded and later transcribed into typescript for analysis. No scoring took place during the interviews—approximately five per child—required to gather the data. Except for illness, children proceeded through the tests in a common sequence with data-gathering covering some six weeks in late fall and a similar period after Christmas.

General Findings

Table 1 lists the mean scores and standard deviations of the total group on the language competency measures. The scores indicate that among these grade one children, if a child scored on the mean in all measures he would utter 91 words in talking about the circus picture and 208 words in relating the Three Bears. In terms of vocabulary he would use 42 different words in commenting on the circus picture; in defining twenty common concepts he would offer 53 pieces of information of which 39 would be descriptive and 13 related to function. Of twenty connectives the child would respond correctly to 10.

The intercorrelations among the measures are given in Table 2. The validity of the tests as measures of language competence is supported by the significant correlations among the measures, thus the number of Information Units correlates at the .01 level of significance with Circus Total, Three Bears, Standardized Vocabulary, Vocab. Range and Connectives. On the other hand, correlations are not so high as to suggest only one facet of language competence is being measured.

TABLE 1
FULL SAMPLE MEANS AND STANDARD DEVIATIONS OF
EIGHT INDICATORS OF ORAL LANGUAGE ABILITY¹

Area of Competence	Indicator	Mean	Standard Deviation
Fluency	Circus Total	90.68	65.93
	Three Bears	207.85	132.60
Vocabulary	Standard ²	18.57	2.06
	Circus Range	41.56	20.35
	Information Units	53.00	23.81
	Descriptive Units	38.56	19.45
	Functional Units	12.99	9.57
Connectives	Connectives	9.57	3.34

¹N=77 students remaining in sample after attrition due to mobility.

²The standardized vocabulary measure employed was the vocabulary subtest of the *Lorge-Thorndike Intelligence Test* (1957).

Identification of Oral Language Performance Subgroups

The primary objective of the data analysis was to form empirically-derived groups of children sharing similar competencies in oral language. To achieve this purpose, a data matrix, defined by the scores of 77 children on seven oral language skill indicators, was submitted to a cluster analysis of cases (see, e.g., Tryon and Bailey, 1970, Chapter 8).

TABLE 2
CORRELATIONS AMONG ORAL LANGUAGE ABILITIES
AND READING SKILLS

Variable	1	2	3	4	5	6	7	8	9	10	11
<u>Fluency</u>											
Circus Total	100										
Three Bears	<u>24</u>	100									
<u>Vocabulary</u>											
Standard	14	17	100								
Circus Range	<u>91</u>	<u>32</u>	16	100							
Information Units	<u>56</u>	<u>44</u>	<u>30</u>	<u>64</u>	100						
Descriptive Units	<u>59</u>	<u>46</u>	19	<u>64</u>	<u>91</u>	100					
Functional Units	18	10	<u>31</u>	<u>26</u>	<u>55</u>	16	100				
<u>Connectives</u>											
Connectives	20	<u>40</u>	<u>21</u>	<u>34</u>	<u>43</u>	<u>36</u>	<u>30</u>	100			
<u>Reading</u>											
Comprehension	03	<u>55</u>	19	10	13	10	05	<u>33</u>	100		
Word Analysis	<u>22</u>	<u>59</u>	02	<u>24</u>	<u>32</u>	<u>33</u>	05	<u>23</u>	<u>50</u>	100	
Listening	20	<u>35</u>	<u>52</u>	<u>28</u>	<u>34</u>	<u>26</u>	<u>28</u>	<u>42</u>	<u>53</u>	<u>21</u>	100

Coefficients are rounded to two places, decimals omitted.

Underlined entries significant at $\alpha = .05$ (where $r > .20$)

significant at $\alpha = .01$ (where $r > .28$).

Briefly, the algorithm for the analysis used was as follows: first, each of the seven variables was independently standardized to $Z(0,1)$ form. Second, the vector of resulting standard scores for each child was compared with the vector for every other child by summing, over the seven variables, the squared differences between pairs of standard scores on corresponding variables. Third, a "cluster" of cases was formed by combining that pair of cases which was characterized by the smallest sum of squared differences. A "common" vector, weighted by the number of cases in the cluster, then replaced the two original individuals' vectors. The sum of squared differences between this common vector and each of the 75 other individuals' vectors was then computed.

The above steps were repeated 75 times, for a total of $(n-1)$ combining operations. In each iteration, the two most similar clusters were combined; at the beginning of the analysis each individual defines a "cluster", and at the end of the analysis all individuals are forced into one "cluster", so that the initial and terminal points of the analysis are artificial. At each iteration, indices of error are computed which reflect the relative amount of "stress", or lack of it, introduced by combining a particular pair of clusters. These indices enable judgments regarding the appropriate number of clusters, or the iteration at which the analysis optimally should be terminated (Patterson & Whitaker, 1973).

An examination of the results of this cluster analysis suggested that, on both practical and statistical grounds, a three-group solution was optimal for the present data. Table 3 contains the means and standard deviations for each of these three groups on each of the seven variables employed in the analysis. The group means were converted to mean standard scores, us-

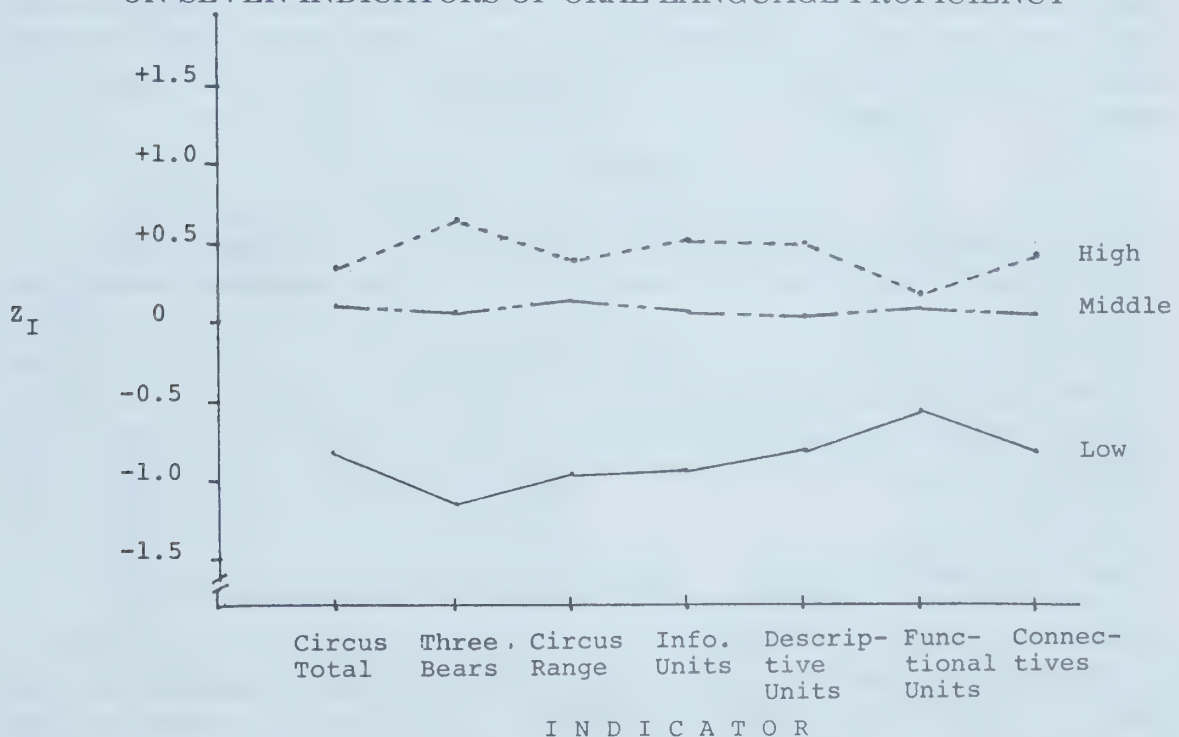
ing the full sample means and standard deviations as referents (see Table 1 for these figures). These mean Z-scores are included in Table 3, and the resulting vectors, or group profiles, are plotted in Figure 1.

TABLE 3
MEANS OF ORAL LANGUAGE SUB-GROUPS¹ ON SEVEN
PROFICIENCY MEASURES

Language Indicator	Low		Middle		High	
	$\bar{X}$	$\bar{Z}$	$\bar{X}$	$\bar{Z}$	$\bar{X}$	$\bar{Z}$
Circus Total	39.18	-0.78	98.19	0.11	115.00	0.36
Three Bears	51.00	-1.18	216.28	0.06	297.44	0.67
Circus Range	22.56	-0.93	44.71	0.15	50.17	0.42
Information Units	30.06	-0.96	54.47	0.06	65.68	0.53
Descriptive Units	22.06	-0.84	39.15	0.03	48.32	0.50
Functional Units	7.44	-0.57	14.09	0.11	15.04	0.21
Connectives	6.87	-0.78	9.68	0.03	11.00	0.41

¹ Sub-group sample sizes were: Low, n=16; Middle, n=34; High, n=27.

FIGURE 1
STANDARD SCORE MEANS OF THE THREE ORAL LANGUAGE SUBGROUPS
ON SEVEN INDICATORS OF ORAL LANGUAGE PROFICIENCY



The profiles given in Table 3 and Figure 1 indicate that all seven oral language measures appear to differentiate the three groups, and the rank order of the groups is the same on all seven variables. The "high" and "middle" groups are somewhat similar in profile, but the "low" group, comprising nearly 21% of the full sample, appears to be substantially below the two higher groups.

The indicator which most powerfully differentiates the three groups is "Three Bears", while the least powerful indicator is "Functional Units".

The other five variables differentiate the three groups with approximately equivalent efficacy. A comparison of the variables on this profile must be conducted with considerable caution, because of the several high inter-correlations among these seven indicators (see Table 2).

A second aspect of the analysis of clusters was to estimate the significance of the difference between the three identified subgroups, with respect to the seven variables used to define the clusters. Separate single-factor analyses of variance would be inappropriate for this purpose because of the significant intercorrelations among the seven oral language measure used. To index the significance of group differentiation, a discriminant function analysis (see, e.g., Tatsuoka, 1970) was performed, using the seven oral language measures employed in the cluster analysis, and the three groups identified as a result of that analysis.

A step-wise discriminant analysis was executed, wherein all seven variables were entered into the function in order of relative significance. The analysis was conducted in this fashion for two purposes: to determine which of the seven indicators significantly differentiate the three groups, and to determine the minimum set of indicators required to differentiate the three groups. At the first step of the discriminant analysis, that indicator was entered which was most effective in differentiating the three subgroups, the memberships of which were known *a priori*. At each subsequent step, that variable was entered into the function which made the most significant additional statistical contribution, after partialling out the effect(s) of the variable(s) included in the earlier step(s) in the analysis. A summary of the results of this analysis is given in Table 4.

TABLE 4
SIGNIFICANCE OF THE DIFFERENCES BETWEEN THE THREE
SUB-GROUPS ON THE SEVEN ORAL LANGUAGE MEASURES

Variable	Initial Significance Level ¹	Significance Level at Entry ²
Three Bears	< .0001	< .0001
Circus Range	< .0001	.0004
Functional Units	.0239	.0919
Connectives	.0002	.4319
Information Units	< .0001	.6477
Descriptive Units	< .0001	.5691
Circus Total	.0004	.8505

¹ Probability associated with the F-ratio for the discriminant function when it included *only* the indicated variable.

² Probability associated with the F-ratio for the *further* contribution of the indicated variable, given the prior variables in the discriminant function.

From the results in Table 4, it is clear that any one of the seven variables, of itself, significantly differentiates the three groups. It is also clear that there is a considerable degree of overlapping variance in the set of seven variables, for after two of them, Three Bears and Circus Range, are entered into the discriminant function, no other variable makes a further significant contribution ($p = .05$). However, Functional Units ($p =$

.09) was retained for further analysis because it seemed to be relatively independent of the other six variables and because the difference between the significance levels (at entry) of Functional Units and the next most significant variable, Connectives, implied that a “natural” cut-off exists after Functional Units as the third variable.

The discriminant function for those three indicators—Three Bears, Circus Range, and Functional Units—was computed to determine the accuracy of classification which might be obtained by employing this condensed range of measures to sort individuals into the three categories of oral language proficiency. This was done by computing, for each of the 77 cases, the posterior probability of that case “belonging” to each of the three groups. Each case is assigned to the group for which it has the highest probability of belongingness. The results of these classifications are given in Table 5.

TABLE 5
ACCURACY OF CATEGORIZING SUBJECTS INTO A *PRIORI*
GROUP MEMBERSHIP USING THREE ORAL LANGUAGE MEASURES

Cluster Analysis Original Group	n	Percent of Original Group Now Classified			Total
		Low	Middle	High	
Low	16	100.0	0.0	0.0	100.0
Middle	34	11.7	47.1	41.2	100.0
High	27	7.4	37.0	55.6	100.0

Based on a discriminant function employing three indicators:
Three Bears, Circus Range, and Functional Units

These results, in Table 5, reinforce the prior observation that the “low” group can be discriminated from the other two groups with considerable facility, but the “high” and “middle” groups, as defined by the cluster analysis, are not so easily separated. Although there were no classification errors among subjects in the *a priori* low group, nearly as many of the middle group were classified as high group membership as middle. Similarly, over one third of the *a priori* high group subjects were identified as middle group members.

Predicting Reading Skills from Oral Language Proficiency

Near the end of the second academic year after the subjects were tested on oral language proficiency, they were given the standardized battery of tests of reading-related skills (*Cooperative Primary Tests*, 1967). Three subtests were selected for inclusion in this analysis: Reading, Word Analysis, and Listening.

To determine the extent to which reading skills are related to oral language proficiency differences, an analysis of variance was performed on each of the three sub-tests from the reading battery. In each of these analyses, oral language sub-group membership was the only independent variable; thus, the ANOVA model and the degrees of freedom were the same for the three analyses, and they differed only in the dependent variable employed. (Intercorrelations among the dependent variables are

TABLE 6
DIFFERENCES ON STANDARDIZED READING TESTS AMONG ORAL
LANGUAGE PROFICIENCY GROUPS: GROUP MEANS AND
ANALYSES OF VARIANCE

Reading Subtest	Group Means			Anova Summaries			
	Low	Middle	High	M.S. (Group)	M.S. (Error)	F ¹	Prob.
Listening	24.83	28.76	35.88	574.69	31.95	17.99	.0001
Word Analysis	34.08	47.68	52.62	1386.44	78.21	17.73	.0001
Comprehension	25.25	27.84	39.67	1195.02	40.81	29.28	.0001

¹ df = 2,58 for the analysis of each dependent variable

given in Table 2.) As indicated in Table 6, the reading differences among the oral language proficiency sub-groups are highly significant.

Planned comparisons were conducted on the group means: for each subtest, the low group mean was contrasted to the middle group mean, and the high group mean was contrasted to the middle group mean. All six contrasts were significant ($p = .05$). It was observed that the reading test means of the three groups are in the same rank order as the profiles resulting from the cluster analysis. For each reading subtest, the means are a monotonic increasing function of oral language proficiency.

Oral Language Proficiency and Social Class

To test whether there was a significant relationship between language skills and social class, a bivariate contingency table of frequencies was prepared according to membership of students in the three schools (which had been selected to represent low, middle and high socioeconomic strata), and membership in oral language proficiency groups. The resulting joint frequencies are given in Table 7. Correlation between the two dimensions was tested using the chi-square approximation, and the result was significant ($\chi^2 = 26.23$; $p < .01$ with $df = 4$).

As seen in Table 7, all students in the low oral language group came

TABLE 7
RELATIONSHIP¹ BETWEEN MEMBERSHIP IN ORAL LANGUAGE
PROFICIENCY SUBGROUPS AND ATTENDANCE AT
SOCIOECONOMICALLY DIFFERENT SCHOOLS

Oral Language Group	Socioeconomic Area of School			Total
	High	Middle	Low	
High	17	6	4	27
Middle	9	15	10	34
Low	0	4	12	16
Total	26	25	26	77

¹ $\chi^2 = 26.23$; $df = 4$; $p < .01$

from the schools in middle and low socioeconomic areas; and those two schools provided only about a third of the high oral language proficient students. Some caution is due in the interpretation of this result, because of the possibility of confounding school quality factors with the socioeconomic characteristics of a school's location.

Conclusions and Implications

The results of this study clearly show that significant differences in oral language competence (as measured by the instruments described) exist among grade one English speaking children in the Canadian urban setting investigated. These differences correlated significantly with the socioeconomic area (low, middle and high) in which the children resided. Children from low socio-economic areas were more likely to have low achievement on the oral language measures than middle or high achievement. Children of high socio-economic background were more likely to have high achievement than middle; none had low achievement. Furthermore, when reading achievement was measured at the end of second grade the oral language groups differed significantly from one another on all three reading measures.

Given the added evidence of Loban's longitudinal study, that initial weaknesses in oral language persisted through twelve years of schooling and that such weakness correlated with poor performance in reading and written expression, it is urgent that Canadian schools develop programs to help children with oral language deficits. Many of the children needing such help will come from low socioeconomic backgrounds but screening measures should be applied in more favoured areas also.

For the purpose of identifying children with poor oral language facility the measures most effective in this study were: the total number of words used in telling the Three Bears, the number of different words used in responding to the Circus Pictures, and the total of functional responses given in definitions. These measures do not, however, form a diagnostic instrument: scores in other areas of language competence examined in this study also separated high from low achievers and would add to a teacher's knowledge of the child's problem.

It is surely time for teachers of "average" Canadian children to be giving much more attention to oral language abilities and the thinking abilities which underlie and accompany them.

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The Effect of Instructional Objectives on Student Learning

This study examined the effect of student knowledge of instructional objectives on learning from written material. A group of 140 sixth grade Ss were randomly assigned to either a group which was given practice in objectives or one which was given no practice in objectives. After three practice sessions, all Ss were given a 1500 word prose passage to read. Prior to reading the passage, Ss received one of the three orienting stimuli: (a) application objective, (b) recall objective, and (c) directional statement. Using analysis of covariance to compare groups, the results indicate that the type of instructional objective does not facilitate application, recall or incidental learning. Practice in the use of instructional objectives had a significantly negative effect on immediate and delayed incidental learning. The findings suggest that knowledge of an objective prior to instruction does not stimulate learning. (Dr. Kurtz is Assistant Professor of Early Childhood Education, College of Human Development, The Pennsylvania State University.)

Anderson (1970) suggested, "The activities the student engages in when confronted with instructional tasks are of crucial importance in determining what he will learn" (p. 349). Several prominent educational psychologists (Bulgelski, 1964; Gagné, 1965; Kibler, Barker & Miles, 1970; Mager, 1962) proposed that if a learner knows specifically what the objective of instruction is, this knowledge will influence his learning of that objective. They assumed that knowledge of instructional objectives enables students to pursue clearly defined expectations. Merrill (1971) commented that if a student is given an objective prior to instruction, it will stimulate him to perform activities which facilitate learning. He reported that objectives have orienting and organizing effects which stimulate the learner to attend to and process relevant information; however, the effect of instructional objectives was not as pronounced as that of some other stimuli such as rules. The related studies of Jenkins and Deno (1971), and Yelon and Schmidt (1971) concluded that their findings do not support the position that the presentation of objectives facilitates learning.

The research of Merrill (1971), Jenkins and Deno (1971), Yelon & Schmidt (1971) seriously questions the effect of instructional objectives on learning. It has raised issues which must be examined before a more definitive conclusion can be drawn. Were subjects (Ss) familiar with instructional objectives? Did they know how to use instructional objectives to help guide their learning? Baker (1969), Jenkins and Deno (1971), and Yelon and Schmidt (1971), recommend that when conducting future studies on behavioral objectives, the Ss should be given training in the prerequisite skills of using objectives. Does an orienting stimulus such as an instructional objective have a differential effect on distinct types of learning? Gagné (1970) has proposed that there are eight types of learning and that each type requires special internal and external conditions to maximize its acquisition.

The purpose of the present study was to investigate instructional objectives as orienting stimuli and their effects upon distinct types of learning. More precisely the research was designed to answer the following questions: (1) When practice in the use of instructional objectives is combined with different types of instructional objectives, is learning from prose material affected? (2) Does practice in the use of instructional objectives affect learning from prose material? (3) Do instructional objectives which specify different types of learning affect learning outcomes relative to these types?

Method

Subjects

One hundred and forty sixth-grade students participated in the study. They were selected from four elementary schools, located in a suburban-rural community. The population of the schools is primarily white and middle class.

Materials

The following materials and tests were specifically selected and evaluated for the study: (1) Three self-instructional branching programs were designed to give Ss practice in using instructional objectives. (2) A series of stories from the *Controlled Reader Program* were chosen. (3) A 13-item test was constructed to measure S's ability to use instructional objectives. (4) A 1500-word prose passage was prepared on the subject of pollution. The passage discussed four rules for combating pollution problems, and it presented two examples of each rule. Irrelevant or incidental facts were interjected throughout the passage. (5) A test on pollution was designed to measure application, recall and incidental learning. There were 12 application items, 8 recall items and 14 incidental items. The application and incidental test items were multiple choice. The application test required that Ss apply the four pollution rules they read in the pollution passage. The incidental test involved the recognition of specific facts presented in the passage. The recall test consisted of completion items which required Ss to write the rule which corresponded to each given example.

Two separate analyses were conducted to determine the reliability of the test items. A test of reliability using a Richardson and Kuder (1939) formula reported the following reliability scores: instructional objective items, .66; application items, .68; recall items, .71; and incidental items, .73. An item analysis was also conducted. On the basis of a composite score from the

application, recall and incidental tests, Ss were divided into High, Middle and Low groups. Each test item was analyzed separately and the proportion of Ss in each group who answered it correctly was determined. In comparing items across the three groups, there was no item on which a low group had a higher proportion correct than a higher group. The item analysis reported a reliability coefficient for all items of .85.

The test items designed to measure students' ability to use instructional objectives and those constructed to measure application, recall and incidental learning from the pollution passage were directly derived from the materials they were testing. The content of the instructional objectives test and the pollution passage was not theoretical or abstract. Test items on instructional objectives and recall and incidental learning were straightforward and related exactly to the text. Even the application items were specifically related to the four pollution rules. A typical application item described a pollution problem and the reader had to select a rule to solve the problem.

Procedure

Two independent variables were analyzed: (1) the presence or absence of practice in the use of instructional objectives, and (2) the types of instructional objective presented to the subject (S) prior to reading the passage on pollution. The practice group had 73 Ss from three sixth-grade classes. The no practice group had 67 Ss from three different sixth-grade classes. The practice Ss were given self-instructional programs on behavioral objectives to read and answer on Monday, Tuesday, and Thursday. On the same days the no practice Ss read stories from the *Controlled Reader Program* and answered related questions. On Thursday the Ss from both groups were given a 13-item test to determine their level of performance in using instructional objectives.

All Ss received the pollution passage on Friday. They were randomly given either an application objective (which stated that S was to apply the pollution rules to solve pollution problems), a recall objective (which stated that S was to write the rule which corresponded to each given example), or a brief directional statement (which merely told S to read the pollution passage carefully). After reading the passage on pollution, Ss in all groups were immediately given the test on pollution, which included application, recall and incidental learning items. Three weeks later they again took the same test. The Ss in all groups were also given the *Lorge-Thorndike Test of Verbal Intelligence*.

The groups were as follows: (1) Group A—Subjects received practice on three days in the use of instructional objectives. (a) Subgroup A₁—Subjects were given an application objective. (b) Subgroup A₂—Subjects were given a recall objective. (c) Subgroup A₃—Subjects received a brief directional statement.

(2) Group B—On three days Ss read stories from the *Controlled Reader Program* and answered related questions. (a) Subgroup B₁—Subjects were given an application objective. (b) Subgroup B₂—Subjects were given a recall objective. (c) Subgroup B₃—Subjects received a brief directional statement.

Results

The data is reported in the following order: first, the results related to practice in the use of instructional objectives and second, the results related to the three questions posed in the introduction. Correlations between IQ and the six

dependent measures ranged from .47 to .67. A comparison of IQ among groups was near significance ($F = 2.86$, $df = 1/139$). As a result of the correlation between IQ and the dependent measures, and the differences between group IQ scores, analysis of covariance was the method used to analyze the data.

Practice

Over a three day period Ss from Group A received an average of 77.14 minutes of training in the use of instructional objectives. After they completed practice in the use of instructional objectives they were compared with Ss in Group B on a test which was designed to measure the ability of Ss to use instructional objectives. There was no significant difference between the groups ($F = 2.96$, $df = 1/139$) on this variable.

Questions

A. When practice in the use of instructional objectives is combined with different types of instructional objectives, is learning from prose material affected? (1) Application Learning: There was no significant interaction between practice and types of objectives on immediate ($F = .24$, $df = 2/130$) or on delayed ($F = 1.01$, $df = 2/124$) application learning. (2) Recall Learning: There was no significant interaction between practice and types of objectives on immediate ($F = 1.07$, $df = 2/130$) or on delayed ($F = .02$, $df = 2/124$) recall learning. (3) Incidental Learning: There was no significant interaction between practice and types of objectives on immediate ($F = 1.66$, $df = 2/130$) or on delayed ($F = .32$, $df = 2/124$) incidental learning.

B. Does practice in the use of instructional objectives affect learning from prose? (1) Application Learning: There was a significant difference between Group A and Group B on immediate application learning ($F = 6.68$, $df = 1/130$; $p = .01$). Group B performed significantly better than Group A on immediate application learning. There was no significant difference between Group A and Group B on delayed application learning ($F = .32$, $df = 1/124$). (2) Recall Learning: There was no significant difference between Group A and Group B on immediate ($F = .00$, $df = 1/130$) or on delayed ($F = 1.23$, $df = 1/124$) recall learning. (3) Incidental Learning: There was a significant difference between Group A and Group B on immediate ($F = 20.39$, $df = 1/130$; $p = .001$) and on delayed ($F = 12.33$, $df = 1/124$; $p = .001$) incidental learning. Group B performed significantly better than Group A on both immediate and delayed tests of incidental learning.

C. When learning from prose material, do instructional objectives which specify different types of learning affect learning outcomes relative to these types? (1) Application Learning: The type of instructional objective did not significantly affect immediate ($F = 1.15$, $df = 2/130$) or delayed ($F = 2.16$, $df = 2/124$) application learning. (2) Recall Learning: The type of instructional objective did not significantly affect immediate ($F = .90$, $df = 2/130$) or delayed ($F = 1.77$, $df = 2/124$) recall learning. (3) Incidental Learning: The type of instructional objective did not significantly affect immediate ($F = 2.18$, $df = 2/130$) or delayed ($F = 1.15$, $df = 2/124$) incidental learning.

Discussion

The present research indicates that knowledge of behaviorally stated instructional objectives does not facilitate application, recall or incidental learn-

ing. Subjects who were not exposed to practice retained more incidental factual information than Ss given practice. Thus, there was differential influence of practice on distinct types of learning. Furthermore, the data shows that the type of objective (application or recall) did not influence learning relative to it. The results of this study can be explained from two theoretical positions: (1) mathemagenic approach and (2) incidental learning framework.

Mathemagenics

It is reasonable to assume that the mathemagenic approach is a relevant frame of analysis. Mathemagenic research has concentrated on determining which instructional devices are effective stimuli. In this context, an instructional objective can be considered an instructional device. The purpose of this research was to determine if instructional objectives stimulate student activities which lead to learning.

Frase (1970) suggested that "mathemagenic behaviors can be usefully viewed as components of an adaptive system in which these behaviors are modified by characteristics of two kinds of inputs: (1) those that occur prior to encounters with the text and (2) those that are characteristics of the text" (p. 344). The results will be explained according to these characteristics.

1. Prior to reading the pollution text, Ss were given an instructional objective or a directional statement. The application and recall objectives required Ss to attend to and retain large amounts of information. In a series of studies by Frase (1968) he discovered that Ss learn more when given specific questions such as, "When was Jack born?" When Ss were given general questions which required a large amount of information to answer, they tended to focus their attention on response terms to the exclusion of the stimuli terms. They did not form the association between the stimulus and response. Frase concluded that questions must be designed to direct the learner to rehearse the stimulus, the response and also the association between the two. Even though the instructional objectives were written in behavioral language, they required a considerable amount of information to correctly complete them. The heavy information load may have caused uncertainty in the inspection behaviors of Ss. They may have been unable to attend to all the content relevant to the objective given them.

2. Frase's (1967) research on length of passage indicated that for retention of relevant information the optimal condition is the placement of questions every twenty lines. "Presumably, if passages are too long, associations between questions and content are difficult to establish. If passages are too short, continuity among prose content is broken" (p. 269). In contrast, incidental learning was improved with longer passages. Thus, the length of passage seems to depend on whether the focus is on retaining specific selected facts or information about the total passage. Was the 1500 word pollution passage too long for Ss given an instructional objective which specified the acquisition of selected information? Apparently, the Ss who received application and recall objectives had difficulty forming the association between the pollution content and the instructional objective.

Another textual characteristic that should be considered is format. In this study the pollution text used a rule-example-example format. First, Ss read an explicitly stated rule, and then they read two examples of how the rule func-

tions. This pattern was followed for all four pollution rules. Throughout the passage irrelevant factual information was interjected. The incidental content was usually limited to a few sentences in any one paragraph of the text. The total passage had 14 irrelevant statements. The remaining content was directly related to explaining the rules or describing an example of a rule. In comparison to the format of many textbooks, the format of the pollution passage could be considered highly structured. This structure may have influenced the inspection behaviors of Ss. For example, the explicitness of each rule may have increased the probability that Ss would attend to it. Thus, the effect of instructional objectives as orienting stimuli would have been minimized. The text itself would have cued the learner to the important information. Perhaps, instructional objectives would have a positive effect on learning from prose which does not cue the learner to relevant content.

Incidental Learning

As shown in the results, there were highly significant differences between Group A and Group B on incidental learning. There are two apparent explanations for Group A not attending to and retaining irrelevant content.

1. The practice in the use of instructional objectives was designed to enable Ss to search for content relevant to a given objective. Subjects were trained to learn content that would help them complete an objective. Emphasis was not placed on retaining information irrelevant to an objective. Consequently, it is not surprising that the practice group did worse than the no practice group on incidental learning.

2. The position of the instructional objective may have had an effect on incidental learning. Frase's (1970) research on the position of questions in prose material indicated that questions placed before a prose passage do not facilitate incidental learning. Similarly, the position of the instructional objectives before the pollution passage may have stimulated student activities which inhibited incidental learning.

The purpose of this study was to investigate the effects of student knowledge of instructional objectives on learning from prose material. It is clear that the instructional objectives, regardless of the type of learning they specified, did not benefit learning, and that training students in the use of objectives has a negative effect on incidental learning. These findings are in concert with recent research by Merrill (1971); Jenkins and Deno (1971); and Yelon and Schmidt (1971). Apparently, instructional objectives do not stimulate mathemagenic behaviors. However, consideration must be given to the issues raised in the above discussion before a definitive conclusion can be drawn regarding the effects of instructional objectives on learning.

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Sequential Analysis of Foreign Language Verbal Interaction

A Flanders-type observation instrument was used to code verbal interactions in foreign language instruction. The interaction process was conceptualized as having cyclical characteristics, and each utterance was classified as being either an initiator of information processing, a response, or an evaluation in function. The resulting strings were ordered and assigned to groups on the basis of commonalities in their internal pattern structure.

Seven such response pattern types were observed, two of which accounted for almost 90% of all occurrences; in turn, these patterns were realized in thirty-two response modules depending on the type of communicative content function of initiators, responses, and evaluators. Other inferences concerning the structure of the foreign language teaching/learning process were drawn from the data, and the usefulness of such non-judgmental data analysis for research in foreign language instruction was discussed. (Dr. Prokop is Assistant Professor in the Department of Germanic Languages, The University of Alberta.)

A study was carried out to obtain systematic quantitative data about the types of verbal behavior used by instructors and students in teaching and learning a foreign language. While details of instrumentation, procedure, and results are reported elsewhere (Prokop, 1974), some aspects of systematicities of recurrence will be discussed below.

Simon & Boyer (1967, 1970) have reported on the use of non-judgmental observation systems in many fields; indeed, since 1965, an entire journal, the "Classroom Interaction Newsletter", has been devoted almost exclusively to research in the analysis of dimensions of teacher-student interaction. Studies investigating specifically the foreign language instruction situation include Moskowitz (1968), Nearhoof (1969), McArdle & Scebold (1968), Wragg (1970), Rothfarb (1970), and Moskowitz (1971). While much of this research has been concerned with the practical use of observation instruments in the training and supervision of teachers, this study has attempted to describe some of the logical dimensions and structural components of FL discourse. It was hoped that results could serve as a concep-

tual and methodological basis for research on dominant verbal behavior patterns in relation to specific behavioral objectives.

Instrumentation

An observation instrument (See Appendix) was used to analyze a total of 31 class sessions involving 50 students and four instructors in Beginning and Intermediate German; this procedure resulted in altogether 13,319 descriptions of instances of verbal behavior. Only a brief description of the instrument and procedures involved is given here; the basic numerical categories are based on Flanders (1970). However, some were rearranged or redefined to fit the specific requirements of FL teaching/learning; additional prefixes and suffixes were also devised. The number codes ranged from 1 through 9 and described general verbal activities, such as giving directions, asking questions, presenting information, responding, *etc.* Prefixes characterized the language of communication; suffixes referred to the type of typical FL activities (such as repeating and imitating, reading, presenting oral reports) and FL content (such as pronunciation, or cultural content). Supplementary suffixes indicated choral response or response alternation where different students responded to a single instructor-initiated verbal behavior. For example,

G6R-G7RZ-G7R-G2P-G7E-G1

is the coded form of a verbal interaction in which students followed the instructor's reading of a text or exercise in German (G6R) with choral reading (G7RZ), after which one student read by himself (G7R); his pronunciation was criticized by the instructor (G2P); the student repeated (G7E) and was praised for his response (G1).

The foreign language interaction was conceptualized along the lines of the language game model (Hyman, 1968; Bellack & Davitz, 1968; Smith & Meux, 1968), in which verbal transactions cyclically follow certain rules. One of the participants in the interaction (i.e. the instructor or a student) initiates a move to which another (or all) participants are normally expected to respond; this response may be further clarified by the same or another participant; subsequently, the response sequence may be evaluated positively or negatively, and additional response clarification and evaluation may follow the first response module. Thus

Initiator//Response₁ —(clarifying) response₂ . . . /Evaluation₁//

first response module

//Response₁ — Response₂ . . . /Evaluation₂ // . . . //

second response module

a new cycle is started with the next initiating move.

In order to get at sequential patterns of verbal behavior, the usual method of entering codes on a matrix (Flanders, 1970) was not employed; instead, a computer program was written with which the interactional flow could be segmented, but which retained the original proximity relations between codes for an entire string from one initiator up to the next initiator. Some patterns had to be analyzed by visual inspection; for example,

when several parallel response modules were dependent on only one explicitly verbalized initiator (which contained information obviating the need for instructions before every response module), the initiating code had to be supplied. Subsequently, strings were ordered and frequency counts were performed. The example given above was rendered as the pattern.

G6R//G7RZ-G7R- .../G2P//G7E- .../G1 //

Results

The results relevant to this part of the study showed, first of all, that there were never more than two response modules to one initiator, and secondly, that each response module never consisted of more than two response components and the evaluation component. Thus the general verbal interaction pattern abstracted was as follows:

$I//R_1 (-R_2) (-Ev_1) // (-R_1) (-R_2) // (-Ev_2) //$

Table 1 shows the total number of patterns, of different patterns, and the pattern identity ratio which indicates how many times, on the average, a pattern occurred. It is apparent that the analysis had produced a large number of totally different patterns of verbal behavior; this result is, of course, due to the large number of possible combinations of types of verbal behavior and is, in turn, a reflection of the complexity of the FL interaction. Some strings, however, differed only, for example, by the language in praise, or by the presence of response alteration. While this information is essential for the discussion of other findings it is not necessary for an understanding of the basic structure of FL interaction. Thus, when the effect of prefixes and supplementary suffixes (A, Z) was removed, the number of uniquely different patterns was reduced dramatically (Table 1).

Some of the patterns occurred only in one class, while others were found with all instructors; in spite of this overlap there was a total of 413 different patterns for all classes taken collectively.

Table 2 shows the distribution of patterns, in which the response module slots were filled, over the two levels of language instruction and the

TABLE 1
FREQUENCIES OF VERBAL BEHAVIOR PATTERNS

Instructor	Original patterns			Patterns with prefixes and supplementary suffixes removed	
	Total number of patterns	Number of different patterns	Pattern identity ratio	Number of different patterns	Pattern identity ratio
Beginners German Instructor 1	1,023	178	5.75	142	7.20
Beginners German Instructor 2	1,519	171	8.88	137	11.09
Intermediates Instructor 1	1,185	210	5.64	162	7.31
Intermediates Instructor 2	996	268	3.72	192	5.19

seven types of patterns observed in this study (other types are, of course, possible). The X's in the table indicate filled slots, the O's empty slots in the module. A typical verbal interaction, e.g. 4S/7S-O-2S/7S-O-1/ is thus represented as X/XOX/XOX/. (For the meaning of these Flanders-type codes see Appendix.) It becomes apparent that the initiator-response with and without subsequent evaluation was the most frequent pattern structure (accounting for more than 80% of all patterns). The two levels were also distinguished by differing frequencies of pattern types, *viz.* Beginners classes were dominated by quick interchanges without evaluation while Intermediates showed initiator-response-evaluation patterns more than half of the time.

TABLE 2
DISTRIBUTION OF VERBAL BEHAVIOR OVER SEVEN TYPES
OF PATTERNS

Pattern type	Beginners	Intermediates	Total
X/X00/000/	56.64%	24.50%	42.11%
X/X0X/000/	30.58%	50.90%	39.77%
X/XX0/000/	4.44%	4.55%	4.49%
X/XXX/000/	.07%	.54%	.29%
X/X0X/X00/	6.29%	17.07%	11.16%
X/X0X/X0X/	1.90%	2.15%	2.01%
X/X0X/XX0/	.08%	.29%	.17%

Figure 1 shows the distribution of response and evaluation moves over the two response modules. It can be seen that—in spite of differences between instructors and between levels—paradigms of underlying FL interaction structure exhibited great similarity, *viz.* the domination of the /XOO/ and /XOX/ response modules.

The seven pattern types were realized in 32 different response modules (Table 3), two of which accounted for almost 80%, in the first module, *viz.*

FIGURE 1
PERCENTAGE DISTRIBUTION OF RESPONSE AND EVALUATION MOVES
OVER THE TWO RESPONSE MODULES

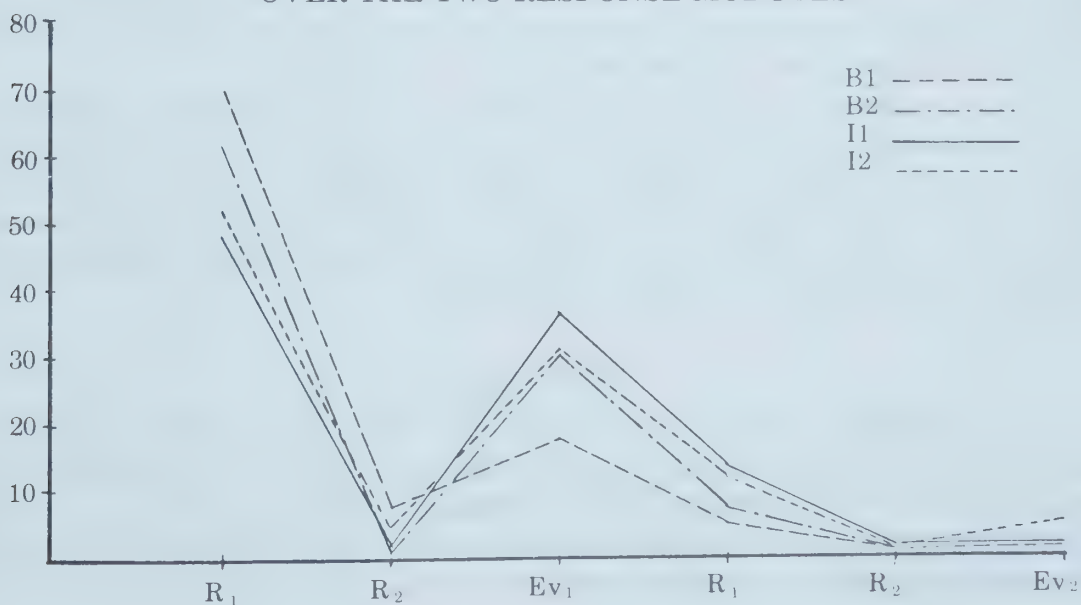


TABLE 3
FREQUENCY DISTRIBUTIONS OF VERBAL BEHAVIOR PATTERNS
WITHOUT PREFIXES OR SUFFIXES OVER THE TWO
RESPONSE MODULES

Initiator	Response 1	Response 2	Evaluation	Primary Module		Secondary Module	
				Pattern	Frequency N=4,723	Pattern	Frequency N=630
I	I	O	O	-500	8.71%	-500	49.25%
			I	-501,502	.11%	-501,502	2.75%
		I	O	-550	1.24%	-550	3.57%
			I	-551	.03%		
		S	O	-570	.03%	-570	.27%
			I	-581,582	.18%		
	S	O	O	-700,800	27.06%	-700,800	26.61%
			I	-701,702,801,802	51.80%	-701,702,801,802	13.99%
		I	O	-750,850	2.89%	-750,850	1.79%
			I	-751,752,851	.33%		
		S	O	-770,780	.09%	-780	.14%
			I	-781,782,881	.42%		
S	I	O	O	-500	5.20%	-500	1.23%
			I	-501,502	1.04%	-501	.27%
		I	O	-550	.51%	-550	.13%
			I	-551	.09%		
		S	O	-580	.07%		
			I	-571,581	.20%		

predictable and unpredictable student responses to instructor-initiator (-700, -800) and student responses to instructor followed by evaluation (-701, -702, -801, -802); the module -500 accounted for another 14%.

The same series of patterns accounted for 40.60% and 50.48%, respectively, in the second response module; this means that the second response module was used predominantly by the instructor to make elaborative responses to what was said before (more than half of all occurrences), while the first response module comprised most frequently student responses to instructor with evaluation by the instructor.

Conclusions

It was concluded from these results that the structure of a verbal interaction in teaching/learning a foreign language can be meaningfully conceptualized as being essentially one paradigm with a number of variants differing by activity or content. As the study was of a descriptive nature and involved relatively limited samples across teachers, students, levels,

objectives, and learning environments, it is obvious that further research will have to be undertaken to ensure high internal and external validity of numerical results. Yet it appears that some very general and cautious observations on verbal interaction may be abstracted from the results obtained in this study.

A participant in the interaction (in this study, 90% of the time the instructor) initiates a verbal interaction; a response follows (90% of the time a student response; instructors responded to themselves; but students never initiated or received responses from other students); the instructor (never a student) praises, corrects or criticizes a student's or even his own response (about 20% of the time). Subsequently, another clarifying response module may follow (about 10% of the time), or a new interaction may be initiated. The first response module was overwhelmingly characterized by students responding predictably or unpredictably to an instructor's evaluation; the second response module consisted most frequently of additional clarification of first module content by the instructor.

The major advantage of analyzing classroom proceedings with an observation instrument of this type can be found in the fact that on-going verbal interaction (one of the important dimensions in teaching and learning a foreign language, in addition to other cognitive, emotional, and social factors) can be coded systematically and objectively, irrespective of the teaching method involved. To be sure, some of the patterns obtained here occurred only a few times, others accounted for large amounts of the interaction process; therefore it may be concluded that there appear to be routine interactions, emergency purpose interactions and, quite conceivably, random or unplanned interactions.

It can be expected that the different combinations of verbal behaviors into patterns observed in actual teaching situations will permit conclusions about specific activities and exercises commonly engaged in by teachers; others could be theoretically constructed and tested for effectiveness and efficiency in the classroom. In such a way, the most effective and efficient teaching and learning behaviors could be obtained without the need to resort to methodological labeling.

APPENDIX

VERBAL BEHAVIOR CATEGORIES AND THEIR PRIMARY AND SUPPLEMENTARY SUFFIXES

[illegible]

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The Student Flow Model—A Flexible Aid to Education Planning

Conventional approaches to educational planning (in particular to the forecasting of enrolments) fail to yield satisfactory results during periods of rapid social or educational change. In addition, they lack the flexibility needed to answer questions regarding portions of the total educational system. This paper briefly outlines an alternative approach, that of the student flow model, which provides this flexibility. Its primary drawback is seen to be the lack of suitable data in readily-available form. Appropriate data could be compiled, however, if planners were to make their needs known to educational authorities. (Mr. Ricker is Assistant Professor of Administration at the University of Regina.)

Introduction

Adoption of a "systems approach" to educational planning has become more and more common in recent years (Correa, 1967; Chirikos & Wheeler, 1968; McNamara, 1971, 1973; Arora, 1972, all review recent literature in this area). The purpose of employing such an approach is twofold—to obtain an understanding of the way the system functions and to predict what will happen to it in the future. In the case of education, much of the emphasis has been on the second of these.

One of the most important variables to consider under such an approach is the number of students in the system, since that quantity is generally closely related to resource requirements and, hence, to budgetary allotments. If education is viewed as a sub-system of society, there is also interest in the numbers of students entering and leaving that sub-system. In addition, it is likely to prove useful to consider geographic boundaries on the society (and educational sub-system) in which case movements of students to and from the region are of importance.

Much of the attention of educational planners has been directed to the aggregate or system-wide level, to such things as total numbers of students, total resource requirements and so on. While this is suitable for some purposes, there are certain situations which call for decisions to be made on a

disaggregated basis, for example the number of teachers required in a particular subject area (say English or industrial arts), the amounts to be spent on facilities for universities as compared to technical schools or the kinds of educational policies most effective for particular socioeconomic groups. Manpower planners are also interested in the numbers of persons with various skills entering the labor force. Information which facilitates decision-making of this type cannot be obtained conveniently using aggregated approaches; at the very least, aggregation must be undertaken in a somewhat different way than at present.

A recent paper in this Journal (Stafford, 1973) is representative of the kind of study which uses aggregated data to arrive at aggregated conclusions. The present paper seeks to show the limitations of such an approach, suggests an alternative way of analysing the educational system, that of student flow models, and discusses the problems of obtaining the proper kinds of data to implement such models.

Educational Systems Analysis—A Summary

As indicated, much of the emphasis in those studies which might be classed as educational systems analysis has been on forecasting the number of students in the system at some future point in time. The simplest forecasting methods involve simple extrapolation of past trends. When both the system and the environment with which it interacts are subject to relatively stable behavior, such methods may yield relatively good projections, but in periods of rapid environmental or system change, such as the years from 1945 until at least the late 1960's, projections based upon past trends are likely to yield highly inaccurate results.

To the extent that population trends are responsible for changes in the numbers of students in the educational system, some form of forecasting techniques based on participation rates by age is likely to come closer to the mark. However when participation rates change (i.e., the entering or leaving age changes for some reason) this method too yields doubtful projections. Stafford's (1973) approach is really just a novel way of looking at participation rates, based as it is on the actuarial technique of life tables, and showing the number from an original population of 100,000 newly born children who are in the school system at each age. Despite Stafford's preoccupation with the insight his approach provides into dropout behavior, his technique primarily shows those still in the educational system. While he looked at the basic schooling period, his approach could easily be modified to include post-secondary education as well.

Other more refined techniques for educational forecasting using information about current and past stocks of students as a basis for projection of future stocks can be devised (see Tanner, 1971, Ch. 7 for a discussion of some of these). The problem with most of them (including that of Stafford) is that they lack the flexibility to provide data of a disaggregated nature. For example, there is no provision for predicting the distribution of students among the various grades within the system, a factor of considerable importance in determining specific resource needs. Without a grade breakdown there is no indication of the probable numbers of graduates from the system at various future points of time, a quantity of

use to planners at the post-secondary level and in the manpower field. Given that most provinces permit considerable flexibility in subject choice at the high school level, even information about the numbers completing high school will not indicate how many may be qualified to seek places in post-secondary institutions or be prepared to enter particular occupations.

Student Flow Modelling

An approach to the more efficient examination of these problems is the student flow model. In form it is similar to the input-output table well-known to economists, but, under appropriate assumptions, it can be treated as a Markov chain, which makes it possible to invoke the associated body of mathematical theory (Stone, 1972). Such models were first proposed in Australia (Gani, 1963), England (Moser & Redfern, 1965; Stone, 1965; Armitage & Smith, 1967) and Europe (Thonstad, 1968) and were employed in Canadian context by Clough and McReynolds (1966) and McReynolds (1971).

The student flow model requires division of the educational system into a set of mutually exclusive, collectively exhaustive parts or *states*, such that at any point of time a student will be in one and only one state. For example, grade one could be one state, grade 12 another, and so on. Further subdivision of individual grades, for example into commercial and academic streams, is also possible. In addition, certain *exit states* may be defined to cover destinations of students who leave the educational system. In theory, at least one exit state will be required; in practice as many can be defined as deemed useful (e.g., one for dropout, one for graduation, one for death and so on). Exit states, to use Markov terminology, will usually be thought of as *absorbing states*: that is, once a student moves to an exit state he remains there permanently. However this need not be the case.

The student flow model seeks to trace the movements of students from one state to another through the system. The key variables in this process are known as *transition proportions* (or *probabilities*). Let the number of students in state r at time t be denoted $n(r, t)$. Further let the number of students who move from state r at time t to state s at time $t+1$ be denoted $n(r, s, t)$. Then the proportion of students in state r at time t who make the transition to state s at time $t+1$, denoted $p(r, s, t)$, will be given by the fraction $n(r, s, t)/n(r, t)$. A matrix of such transition proportions can be constructed showing the proportion of students in each origin state r who move to each possible destination state s in a unit time period. Since some transitions are forbidden (such as from grade 1 to grade 9) or unlikely (such as grade 12 to grade 3) many of the matrix entries will be zero. The elements of the principal diagonal of the matrix will consist of those remaining in the same state (i.e. repeaters).

Given a vector $n(t)$, of which the i^{th} element is the number of students enrolled in state i at time t , another vector $u(t+1)$, of which the j^{th} element is the (net) number of exogenous entrants to state j at time $t+1$, and the matrix of transition proportions, denoted $P(t)$, it follows that:

$$n(t+1) = n(t) P(t) + u(t+1)$$

Using the model recursively with a succession of u vectors, enrollment vectors, n , can be projected for as many time periods as desired.

A further refinement possible with such a model is the division of the student population into subgroups on the basis of certain socioeconomic or educational characteristics. For example, students could be categorized on the basis of sex, parent's education, size of school attended, number of previous grade failures, etc. Such an approach facilitates comparison of failure, dropout or other patterns among various groups and, given information about other variables related to these groups (such as birth rates), makes possible a more careful projection of numbers of students likely to be in each grade at some future time.

In contrast to Stafford's (1973) approach, the student flow model (particularly when students are subdivided as suggested above) can simultaneously indicate both the level of education attained prior to dropout and the relationship of other selected socioeconomic or educational variables to dropout behavior. In addition, of course, the flow model shows the pattern of progression for those remaining within the system.

Data Requirements

In order to implement a flow model it is obviously necessary to have data of an appropriate kind. This is a problem which has long plagued researchers in the area. Some have been able to obtain data regarding student flows which, with some adjustment, could be used (McReynolds, 1971; Baisuck, 1969). Others had to go to great lengths and use devious means to obtain the necessary data in a form suitable for use (Thonstad, 1968). In general, however, flow data are almost impossible to obtain (Stone, 1972).

While the raw data from which students flows could be determined normally exist in the form of cumulative student records, they are typically not compiled in a form which would permit input to the model described. Rather than showing those who were in grade i one year and in grade j the next (where of course $i = j$ is a possibility), emphasis in published records is placed on the stock of students in grade i in a particular year. Flows cannot accurately be inferred from such data.

There is, however, a refinement to usually-compiled information that could permit direct calculation of student flows even in the absence of observations of the progress of individual students. This is the compilation of annual age-grade data. However, simply breaking down existing student stocks by age and grade will not suffice. It will also be necessary to have age-grade breakdowns for school entrants and leavers of various kinds. Given accurate, consistent data in all these categories, it will then be possible, though not necessarily easy, to create the underlying flow data.

Data Availability

The question then arises as to the availability of such data in Canada in a form accessible to researchers and planners. One place where at least summary data regarding student enrollment normally appear is in the annual reports of the various provincial departments of education. However, based on an examination of reports from all provinces for various recent years, it can be concluded that in no case are the data necessary for implementation of a flow model presented. Only Alberta, Newfoundland,

Prince Edward Island, and Ontario present even stock data on an age-grade basis, the latter doing so only every five years. Ontario shows immigration by age but not grade; other provinces do not provide even that much information. Statistics Canada provides age-grade data in some publications (Statistics Canada, 1971, 1972) but only for a single school year. If such were made available on an annual basis, this would be a major step towards providing the data necessary for implementation of flow models. As indicated above, however, it would still not be sufficient.

Conclusions

The school life table as discussed by Stafford (1973) is one means of displaying certain information about the educational system. The present paper has attempted to show the limitations of that method and to indicate that the use of student flow models can provide considerably more information to educational planners than Stafford's approach. In particular, the student flow model, while capable of dealing with aggregate questions, also can provide disaggregated information which is not available through use of more traditional approaches. The primary disadvantage in the use of student flow models was seen to be lack of data in suitable form, whereas data necessary for preparation of a school life table are much more readily available.

The question that educators must face is whether a less informative but easier to work with technique should be used in preference to one which could provide more insight into system behavior but which poses problems in application. Surely the approach of planners should be to encourage the compilation of more useful bodies of data. It is certainly clear that the raw data necessary for the application of such techniques as educational flow modelling are available within the system; they are lost through inappropriate or too early aggregation. Until planners clearly articulate their needs, those responsible for data accumulation cannot be expected to meet those needs.

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The Developmental Stages of L. S. Vygotsky and J. Piaget: A Comparison

The present study was designed to explore the relationship between the theoretical models of cognitive development proposed by L. S. Vygotsky and J. Piaget. One hundred and four subjects aged four to sixteen years were selected. All subjects were in the average range of intelligence, were in the usual school grade for their age, and had no history of neurological or emotional problems. The subjects were administered the Vygotsky Test of Concept Formation as well as the Piagetian tasks related to the conservations of continuous and discontinuous quantity, weight, area, volume, and density. Subjects' responses were scored qualitatively in terms of the described developmental model of each theorist.

Developmental levels were converted to a numerical scale within each system and were compared through correlational analysis. The obtained results led to the conclusion that the two theoretical models are closely related in that both Piaget's and Vygotsky's models of cognitive development appeared representative of children's thought processes at all levels of sophistication. (Dr. Stewin is Associate Professor in the Department of Educational Psychology, The University of Alberta; Dr. Martin is in private practice, Calgary.)

The purpose of the present investigation was to examine the relationship between the stages of cognitive development proposed by L. S. Vygotsky and by J. Piaget. The theories of Vygotsky and Piaget were selected for study and comparison for a number of reasons. Primarily, however, the rationale rests on the similarities of their philosophies concerning the nature of human intellect and of their overall orientations towards research.

The general views of man held by Piaget and Vygotsky correspond closely; both theorists have considered the development of individual cognitive processes within the larger context of overall human biological

and social evolution. Piaget and Vygotsky sharply differentiated between the higher and lower mental functions on the basis of abstract conceptualization, and both have considered the most sophisticated developmental levels of primary theoretical importance. As would be expected, the development of language and its relation to thought has been of considerable concern to both investigators (Vygotsky, 1962).

The investigations of both men began by analyzing actual conditions of the child's reality. Their research methods involved devising problems requiring certain lines of logical reasoning for their solution, which were then presented to children of various ages. The purpose of these experiments was to provide situations which permitted observation of emerging thought processes in addition to completely developed functions, thus yielding qualitative rather than quantitative data. Vygotsky's research has been described by Elkonin (1967) as "abstract experimental models rather than empirical studies." The same is true of Piaget's work.

Piaget's theory of cognitive development has been described as "a progressive structurization whereby actions and intellectual operations become organized into coherent systems" (Inhelder, 1966, p. 160), which applies aptly to Vygotsky's outline as well. Each theorist has divided the route to mature thought into "units" (variously labelled periods, phases, stages, etc.) but, more importantly, their views on the nature and function of these units are similar. Both have considered the order of attainment invariable, but recognize that individual children reach given levels at different ages. Piaget assigns approximate age levels to his stages, representative of the average age of attainment of various functions. Vygotsky may have done so as well, but there is no available record of his age parameters. It is suspected that Vygotsky worked primarily with school age children, as he was employed in an educationally-oriented institution, and that Piaget's earliest period, the sensory-motor, would have no equivalent in the Vygotsky system. Thus, the first Piagetian period was not included in the present investigation.

Vygotsky's Model of Cognitive Development

In contrast to the number of ingenious tasks devised by Piaget to provide insight into child thought, Vygotsky is known to have used only one method to assess conceptual level in his subjects. This method is commonly known in Western psychology as the *Vygotsky Blocks*, the *Hanfmann-Kasanin Test*, or sometimes as the *Concept Formation Test*. The test consists of a number of geometric solids which are presented to the subject. One block is visibly coded with a nonsense syllable, but the coding on the others remains hidden. The subject is required to separate the blocks into four groups and provide his reasons for his classification. If his first groupings are in error, a further clue is provided by revealing the code on another piece. This method is continued until the nonsense words gradually come to be defined by the characteristics of the blocks and, thus, a totally new concept is formed by the subject. This unique instrument was originally devised by Ach, but slight modification of the technique was made by Vygotsky and his co-worker, Sakharov (Vygotsky, 1962).

Vygotsky administered this test to a large sample of children of various

ages. On the basis of his observations, he formulated the model of conceptual development described below. This model corresponds closely to Piaget's, notwithstanding the fact that each is based on data gleaned from investigation of quite different areas of child behaviour and problem solving. A diagrammatic representation of both models is presented to clarify the phases of development described (See Table 1).

TABLE 1
COMPARATIVE DIAGRAM OF THE STAGES OF COGNITIVE
DEVELOPMENT OF L. S. VYGOTSKY AND J. PIAGET

Vygotsky's Model	Piaget's Model
	Period of Sensory Motor Intelligence (birth to 2 years)
Phase of Syncretic Images	Period of Concrete Operations (age 2 to 11)
Trial and Error Stage	Subperiod of Pre-operational Representations (age 2 to 7)
Perceptual Stage	Stage of Representational Operations (age 2 to 4)
Composite Stage	Stage of Simple Representations (age 4 to 5 1/2)
	Intuitive Stage (age 5 1/2 to 7)
Phase of Complexes	Subperiod of Concrete Operations (age 7 to 11)
Associate Stage	
Collections Stage	
Chaining Stage	
Diffuse Stage	
Pseudo-conceptual Stage	
Phase of Concepts (puberty)	Period of Formal Operations (age 11 years on)
Stage of Maximal Similarities	
Stage of Potential Concepts	
Stage of Genuine Concepts	

Vygotsky divided the ascent to mature concept formation into three basic phases, which are in turn divided into several stages. During the first phase, performance on the blocks is characterized by arranging the pieces in "unorganized congeries" or "heaps" which consist of disparate objects grouped together without any apparent basis for classification. This behaviour suggests the meaning of the nonsense syllable is extended in a diffused and undirected manner to include "inherently unrelated objects linked by chance in the child's perception" (Vygotsky, 1962, p. 59). The child often tends to mistake subjective bonds for real ones, however, these primitive associations reflect a degree of reality insofar as they coincide with relations between the child's perceptions.

The first syncretic phase subsumes three distinct stages of performance on the Vygotsky Blocks. The most primitive stage of thinking involves purely random groupings, to which objects are added only on the basis of guesses. When a guess is shown to be in error by examiner clue, the subject guesses again to replace it; hence, this level is known as the "trial and error stage." The second stage of sophistication is largely perceptual as it is composed of groups determined primarily on the basis of the spatial posi-

tion of the blocks. Here the subject forms a "purely syncretic organization" of his visual field as a result of spatial or temporal proximity. The third stage included in the first major phase involves more complex syncretic images, as groups are formed by taking elements from heaps already composed in the manner of the first or second stage. Higher sophistication rests solely on the fact that a two-step operation is involved, as the new combination has no intrinsic bonds, thus no more order than the simple assembling of heaps.

Progress to the next major phase occurs when "objects are united in the child's mind not only by subjective impressions but also by bonds actually existing between these objects" (p. 61). Vygotsky calls this second phase "thinking in complexes" and believes that to achieve it a child must be capable of differentiating between real and subjective bonds, so is growing from syncretism toward objective thinking. Complexes reflect coherent thought, but do not involve objective relationships in the more sophisticated fashion of conceptual thinking. The connections between the elements of a complex are concrete and factual, rather than abstract and logical. The factual bonds are discovered through direct experience, but lack logical unity. The primary difference between a complex and a concept is that the bonds of the former may be of many different kinds. "Any factually present connection may lead to the inclusion of a given element into a complex" (p. 62), while a concept is based on only one attribute.

Five basic types of complexes represent the stages of the second phase. The most primitive of these is the associative type, which is based on any bond the child forms between the sample and some other blocks. The sample and other additions need not involve a common trait. Similarity, contrast or proximity between pieces may each variously establish bonds. Vygotsky feels such groupings reflect a change in word meanings from designating a "proper name" of an individual object to representation of a "family name" of a group of objects related in many kinds of ways. The second stage of complexes resembles collections, as objects are placed together on the basis of characteristics that contrast with and complement the sample. Here one attribute is assumed to be the basis of grouping. This stage in the development of child thought is rooted in practical everyday experience where functional groupings such as clothing or cutlery provide models of natural collection complexes. Association by difference is often combined with the earlier associative stage producing groupings rooted in mixed principles.

Vygotsky defines the collection complex as grouping on the basis of functional co-operation or participation in the same practical operation. Collections are followed by chain complexes, which involve "dynamic, consecutive joinings of individual links into a single chain with meaning carried over from one link to the next" (p. 64). The sample is not of central significance, and there is no consistency in the type of connection formed, as the decisive attribute keeps changing throughout the process. An element is included in the group on the basis of one characteristic but is considered in terms of all its other attributes as well. In a concept, on the other hand, one trait is abstracted and considered specifically. Complexes do not include hierarchical organization as all attributes are functionally equal.

Vygotsky considers the chain complex the purest form of second phase thinking, as it is perceptually concrete and factual. A complex does not rise above its own elements; it merges with the concrete objects that compose it. This fusion of general and particular is distinctively characteristic of all complexes but particularly of those of the chain type. Chain complexes are vaguely defined, so often remote similarity suffices to create a bond.

The fourth stage in complex thinking is reached when the child forms diffused complexes. This type involves fluid indeterminant bonds and is so indefinite as to be virtually limitless. The child stays within the limit of concrete bonds, but as the material on the Vygotsky task differs from typical environmental objects, bonds are tenuously based on dim, unstable attributes. An example of this type of thinking would be choice of trapezoids to go with triangles, as they look like triangles with the tops cut off. Vygotsky considers "the surprising transitions" and "startling associations and generalizations" (p. 66) of children to be the real-life parallels of such performance on the blocks.

The highest level of complex thinking is the pseudo-conceptual stage, so named because generalizations of this type phenotypically resemble mature concepts, but are based on concrete perceptually linked bonds. A pseudo-concept is formed when a child produces a grouping that could "just as well have been assembled on the basis of an abstract concept" (p. 67). Vygotsky is of the opinion that pseudo-concepts predominate over all other complexes in the pre-school child's life because "complexes corresponding to word meanings are not spontaneously developed by the child. The lines along which a complex develops are predetermined by the meaning a given word already has in the language of adults" (p. 67). Thus the stable, permanent, everyday meaning of a word is communicated to the child, who forms a complex around it. Vygotsky considers complexes and concepts functionally equal, as pseudo-concepts provide a connecting link between the two in the form of a "complex already carrying the germinating seed of a concept" (p. 69). Verbal communication is a powerful factor in conceptual development, but only because the prevalence of pseudo-concepts permits understanding between individuals at different levels of conceptual sophistication. The child himself is typically unaware of the change from complex to conceptual thinking, as pseudo-concepts are not just a fleeting phenomenon elicited by the blocks test, but a genuine "genetic" development that may be readily observed in everyday life. Vygotsky concedes that the forms of concrete thinking so clearly differentiated by blocks performance "often appear in reality in mixed states" (p. 69).

Vygotsky views the complex thinking of the second phase one root of concept formation, but feels the type of thinking found in the third phase represents a second, independent root. In reality, phase three formations appear in rudimentary form long before the phase of complexes has run its course, but they are considered to be a higher level of development as a degree of abstraction is required. Complexes unify scattered impressions with bonds and relationships and as such create a basis for the more advanced generalizations of the third phase. Abstraction requires singling out elements and viewing them apart from the total concrete entity, thus, genuine concept formation requires separation and unification. Complex

thinking cannot both synthesize and analyze, as by nature, it involves an overabundance of connections.

The first stage of the most mature phase of conceptual development occurs in blocks performance when the child groups together maximally similar objects. The test contains no identical blocks, therefore, the members of each group are dissimilar in many respects. This implies that the child is paying more attention to some traits than others, such that this preferential treatment has breached hitherto global perception of the materials. Performance of this type represents the beginnings of positive and negative abstraction.

The next stage, designated "potential concepts", involves grouping on the basis of a single attribute. Again the product is indistinguishable from that obtained from true conceptual thinking, but Vygotsky considers it a precursory stage, as it involves only primitive isolated abstraction. At the complex level, the abstracted element is unstable and loses temporary dominance to other traits. "Only the mastery of abstraction, combined with advanced complex thinking, enables the child to progress to the formation of genuine concepts" (p. 78). The decisive role in this process is played by words, which direct "all the part processes of advanced concept formation" (p. 78).

The final stage of concept formation is reached during adolescence, when primitive patterns gradually give way to true concepts. The adolescent does not immediately cease to use earlier thought forms upon discovery of true concepts, indeed, the former may predominate many areas of thinking for some time. The transitional character of adolescent thought is evidenced by a striking discrepancy between ability to use concepts and to define them. Vygotsky feels this discrepancy, which can also be noted in adult thought, "confirms the assumption that concepts evolve in ways differing from deliberate conscious elaboration of experience in logical terms. Analysis of reality with the help of concepts precedes analysis of the concepts themselves" (p. 79).

Vygotsky's overall view of concept formation is of "movement of thought within the pyramid of concepts, constantly alternating between two directions, from the particular to the general and from the general to the particular" (p. 80). He feels concepts are developed not merely through "interplay of associations" but as the result of an "intellectual operation in which all elementary functions participate in a specific combination" guided by the use of words as a means of centering attention, as well as abstracting, synthesizing and symbolizing traits.

Thus, in Vygotsky's model, the child develops from a creature at the mercy of his immediate perceptions to an individual capable of controlling and ordering his perceptions through the application of mature thought processes to sensory data. So, also, does Piaget describe the evolution of the cognitive processes from the sensory, through the concrete, to the abstract levels of functioning.

Piaget's Model

As the Piagetian model is well known in Western psychology, it will be presented in abbreviated and necessarily simplified form within this paper.

Basically, Piaget divides the route to mature thought into three major periods composed of stages, sub-periods, and sub-stages. The structure of his developmental framework varies slightly from one publication to the next with regard to minor points, however, his overall position on cognitive change remains consistent. The version described herein is taken from Flavell (1963).

The earliest period of cognitive development is that of sensory-motor intelligence, which encompasses the time from birth to about two years of age. During this period the infant gradually advances from a purely reflex level of response to a state where he is aware of, and responsive to, his immediate environment and is able to take direct action upon it at the concrete, purely perceptual level. The child becomes capable of primitive organizations of action to solve immediate practical problems, but is not yet capable of any type of symbolism. Six stages and several smaller sub-stages occur during this period, however, these will not be described in detail as this earliest period was not of concern in the present study.

The second developmental period is of lengthy duration, occurring between two and eleven years of age in most children, and including many important cognitive changes. This is termed the period of concrete operations and is divided into two major sub-periods, the sub-period of pre-operational representations (between two and seven years of age) and the sub-period of concrete operations (from ages seven to eleven). The first sub-period includes three smaller stages—the beginnings of representational thought from two to four years, simple representations or intuitions from four to five and one-half years, the articulated representations or intuitions from five and one-half to seven years. During this pre-operational sub-period the child learns to understand and use primitive symbols, thus “interiorizing” the world of action into thought operations. This is a time of symbolic practice and preparation, prior to entering the more sophisticated world of concrete operations. By the time the child has reached this second sub-period, he begins to display stable and orderly adaptations to his environment. He is now able to organize simple cognitive structures into a coherent series or groupings and is at last in possession of co-ordinated, reversible systems of logical operations. The child’s thinking becomes “mobile”, and so loses the ego-centricity and perceptual dependence of earlier phases. He now relies primarily on perception rather than the action-orientation of the sensory-motor period, however, both perception and thoughts are irreversible.

Piaget’s final period of conceptual development is that of formal operations, which occurs after eleven years of age. At this level the child is not reality bound in his thought; he is able to conceptualize in the purely abstract world of hypothetical possibility. He is able to reason deductively and adds another dimension to his former concrete operations by now being able to convert them into propositions. Whereas the child in the concrete operations period is largely experience bound and can only extrapolate from the immediate situation in a very limited symbolic sense, the adolescent is capable of beginning investigation in the realm of abstract possibility and then checking his hypotheses with real evidence.

Thus, Piaget and Vygotsky were contemporaries, independently in-

vestigating similar problems in separate areas of the world. Despite the parallels noted between their philosophies and their theoretical formulations, Vygotsky has remained a little known figure in Western psychology. Perhaps as a consequence little research has been available examining either his proposed model of cognitive development or his methodology. In contrast, innumerable studies have been reported lending either support or opposition to Piaget's conceptualizations regarding child behaviour and development.

The Present Study

Only one study to date has attempted to compare the work of Vygotsky and Piaget, albeit on a rather indirect basis. This study was carried out in 1972 by Denney, and involved a comparison of "free classification procedures" similar to those used by Vygotsky and by Inhelder and Piaget. The stimuli developed for this experiment were a set of 38 wooden blocks which varied in colour and shape. In the "free grouping procedure" (based on Piaget's classification tasks) the subjects, aged two to sixteen years, were told to group the blocks in any way they wanted. In the "verbal labelling procedure" (based on Vygotsky's work) the subjects were shown one block identified by a nonsense syllable and asked to find all other blocks that might be the same type. Obviously the verbal labelling procedure is considerably more difficult than the free classification tasks, thus, it is hardly surprising that Denney found different types of responses offered for each. Indeed, neither theorist has ever claimed any similarity between their classification tasks or the results found from them as Denney acknowledges.

Denney's stimuli appear similar to those of Vygotsky (although the comparability can only be roughly guessed) but quite different from Piaget's materials. The questions posed to the subjects are close to those of Piaget, but are vastly at variance with Vygotsky's thorough procedure. Thus, the real question involved in this research is the relationship between the devised procedures and the original tasks of Vygotsky and Piaget. Until this point is fully explored the implications of Denney's results to the developmental theories of Vygotsky and Piaget cannot be meaningfully assessed. Denney's study makes the error of comparing a relatively minor aspect of Piaget's theory with the basis of Vygotsky's entire model of cognitive development. The present investigation was designed to compare the two theories on a more equal basis. This was to be accomplished by ascertaining the cognitive level of a given child according to each system, and then correlating the results over a representative sample of children.

Method

Each subject was individually administered the *Vygotsky Blocks* and several Piagetian problems. Responses were recorded by both an audio tape machine and examiner notation. All testing and scoring was done by the principal experimenter, however, subject responses were subsequently classified into stages by two independent raters.

The Sample

Performance on both Piaget's and Vygotsky's tasks has been found to be readily influenced by emotional and personality factors (Hanfmann &

Kasanin, 1937, 1942; Rappaport, 1941, 1942; Des Lauriers & Halpern, 1947; Fosberg, 1947; Semeonoff & Laird, 1952; Goldschmid, 1967, 1968; Rappaport, Gill & Schafer, 1968), and neurological impairment is of consequence on the *Vygotsky Blocks* (Hanfmann & Kasanin, 1937, 1942; Rappaport, Gill & Schafer, 1968). Rather surprisingly, the effects of organicity on Piagetian tasks does not seem to have been explored. Educational experience has some effect on Vygotsky scores (Hanfmann & Kasanin, 1937, 1942; Rappaport, 1941, 1942; Aldrich, 1944; Norman, Baker & Doehring, 1950; and Rappaport, Gill & Schafer, 1968) but schooling is not a crucial concern with regards to Piaget's theory. Intelligence is a highly significant variable for both theories (Hanfmann & Kasanin, 1937; Rappaport, 1941; Aldrich, 1944; Elkind, 1961; Rappaport, Gill & Schafer, 1968; Goldschmid, 1967; Inhelder, 1968).

Four male and four female children at each successive chronological age between four and sixteen years inclusive were selected, yielding a total sample of 104 subjects. Only children who fell within the average range of intellectual ability on individual intelligence test administration, and who were in the appropriate school grade for their age were considered as possible subjects. Children whose records were suggestive of possible organic brain damage or of emotional difficulties were excluded from the sample.

Task Selection

Vygotsky's model of cognitive development is based solely on performance on his *Blocks Test*, but there is no comparable comprehensive measure in Piaget's scheme, as he prefers to assess cognitive level on the basis of a number of less inclusive tasks. Thus it was necessary to select Piagetian problems for use in the present study that could be considered genuinely representative of Piaget's total development model. It was also deemed desirable to choose tasks that could be administered in a relatively short time with a minimum of equipment.

Conservation tasks were chosen as the most appropriate measure of developmental level because the conservation process is considered by Piaget to be a "necessary condition of all rational activity" (1965, p. 3). There are several different types of conservation described by Piaget (quantity, length, number, volume, *etc.*) which are characteristically achieved by the child at ages varying from six years to early adolescence. Some of these skills are attained at ages well beyond the range postulated by Piaget as encompassing the sub-period of concrete operations, which immediately suggests formal operational functioning. This aspect of conservation performance is discussed at length by Piaget and Inhelder (1958), with the conclusion that conservation problems are of two types, "simple" or concrete operational, and "complex" or formal operational. All conservation problems involve two types of reversibility of thought, simple inversion negation and reciprocity (which involves recognition of compensatory changes in two related stimuli), but the simple conservations require only sequential application of these reversibilities whereas complex problems necessitate simultaneous use of both types. Thus Piaget considers conservations of quantity, length, number, substance and area to be in the concrete sphere, whereas volume, density, momentum and rectilinear motion conservations are at the formal level.

In a discussion of conservation in terms of Piaget's overall developmental theory, Inhelder *et. al.* describe formal operations as "characterized by hypothetico-deductive strategy and the potential for utilizing all possible transformations of relations" (1966, p. 160). This suggests that the truly formal operational thinker should be able to successfully perform all types of conservation problems.

Both theoretical and practical considerations resulted in the selection of seven conservation problems for use in this investigation: substance, continuous quantity, discontinuous quantity, weight, area (at the concrete level), volume, and density (at the formal level). In addition one Piagetian verbal reasoning problem was included, as it afforded further quick assessment of formal operational cognitive capacity. The *Vygotsky Blocks* were always administered first owing to the length of the task, and the Piagetian problems were arranged in approximate order of ascending difficulty (as quoted above). The verbal question concluded the battery.

Instruments

The Vygotsky Blocks

The *Vygotsky Blocks* have been described by Hanfmann and Kasanin as follows:

The experimental material consists of 22 wooden blocks varying in colour, shape, height and size. There are five different colours: red, blue, yellow, green and white; six different shapes: circles, squares, triangles, trapezoids, hexagons, and half-circles; two heights: tall blocks and flat blocks $3/4$ in. and $5/16$ in. respectively); and two sizes of top (or bottom) area: large and small blocks (the area of top surface approximately $1\frac{1}{3}$ sq. in. and 3.5 sq. in. respectively). On the under side of each figure . . . is written one of the following four nonsense words: *lag*, *bik*, *mur*, *cev*. Regardless of colour and shape, *lag* is written on all large tall figures, *bik* on all large flat figures, *mur* on the small tall ones, and *cev* on the small flat ones (1937, p. 521).

The administrative procedure devised by Meece and Rosenblum (1965) was adapted for use in this study. This method is a slight modification of Hanfmann and Kasanin's administration for children, consisting essentially of requiring the subject to assign the blocks to four groups, then to explain the basis of his initial categorizations. The examiner identifies one error to the subject by providing a clue to correct grouping, and instructs him to try again. Each "clue" consists of revealing one nonsense syllable and is repeated after each trial until all blocks have been exposed and correctly grouped or have been spontaneously classified by the subject. The subject is guided into verbally formulating a principle to govern correct grouping, the blocks are turned over again and the task re-administered without examiner assistance.

Each subject's performance was qualitatively categorized on the basis of Vygotsky's developmental stages by the experimenter and two independent raters. The raters were senior university students with some experience in the area of developmental psychology, but had no familiarity with Vygotsky's theories prior to the experiment. They were given copies of Vygotsky's book, *Thought and Language*, and their attention was directed to the section describing levels of performance on the Blocks (1962, pp. 52-81). On the basis of the knowledge gained from this exposure, the raters in-

dependently assigned each verbatim copy of the subject's responses to the appropriate cognitive stage. Ratings were transformed to a numerical scale ranging from a score of 1 for the lowest level of development to a score of 11 for the highest for purposes of statistical manipulation. Inter-rater reliability within the present study was .97.

One other qualitative measure was used, based on the scoring procedure devised by Stones and Heslop (1968) and carried out by the experimenter alone. Each successive grouping by a subject was rated along a three stage scale (syncretic, complexive, conceptual) and the subject's overall performance was assigned to the most frequently occurring level of operation. Ratings were then transferred to a three point numerical scale.

Piagetian Tasks

All administration procedures were taken from Goldschmid (1967) with the exceptions of the method for presenting the conservation of density task (Brainerd & Allen, 1971b), the check on the conservation of continuous quantity (Piaget, 1967), and the formal operations question (Piaget, 1950).

Responses to each task were qualitatively judged on the basis of Piaget's descriptions of conservation attainment and overall developmental stage theory (1957, 1968). Subjects who conserved on less than three (of five) concrete tasks and who failed two or more (of three) formal problems were judged to be at the pre-operational level of cognitive development. Children who conserved on three or more of the concrete tasks, but on less than two in the formal realm were considered operational thinkers, and those who "scored" 4 or 5 on the concrete tasks and 2 or more on the formal tasks were rated as being at the formal operational stage. Each response was evaluated twice—once considering the comparative response only, and

TABLE 2
CORRELATIONS BETWEEN PERFORMANCES ON THE VYGOTSKY TASK
AND THE PIAGET TASKS

Vygotsky Blocks	Level (Rater #1)	Level (Rater #2)	Level (Rater #3)	Overall Vygotsky Level*
Substance	.562	.562	.584	.522
Continuous Quantity	.601	.601	.612	.527
Discontinuous Quantity	.592	.592	.610	.536
Weight	.488	.488	.498	.446
Area	.546	.546	.556	.489
Volume	.308	.312	.334	.369
Density	.419	.419	.434	.416
Formal Operations Question	.465	.458	.455	.426

* Based on Stones and Heslop (1968)

once considering the explanation given for the phenomenon as well. Subject's performances on each Piagetian task were transformed to a three point numerical scale representing pre-operational, concrete operational and formal operational thinking.

Results

Comparisons of the Piagetian data with the Vygotsky findings were analyzed through the use of correlations. Correlations between level of performance on the eight Piagetian tasks and on the Vygotsky task are contained in Table 2. All are significant at either the .05 or .01 level.

Table 3 contains the percentages of subjects functioning at the levels of conceptual development proposed by Vygotsky and by Piaget, as observed on the tasks administered. Very few of the subjects were rated at Vygotsky's first phase (4.8%) in comparison with those at Piaget's pre-operational stage (25.96% considering judgment only, 27.88% considering explanation).

TABLE 3
PERCENTAGE OF SUBJECTS FUNCTIONING AT EACH MAJOR STAGE

Stage	Percentage
<u>On the Vygotsky Blocks</u>	
Phase of Syncretic Images	4.8
Phase of Complexes	58.65
Phase of Conceptual Thinking	36.53
<u>On the Piagetian Tasks - Considering Judgment Only</u>	
Pre-operational Stage	25.96
Concrete Operational Stage	43.26
Formal Operational Stage	30.76
<u>On the Piagetian Tasks - Considering Explanation</u>	
Pre-operational Stage	27.88
Concrete Operational Stage	50.96
Formal Operational Stage	21.15

The correlations between the numerical scales representing the stages in each theoretical system are shown in Table 4. All are significant at either the .05 or .01 level, despite the finding that few subjects were functioning at the initial phase of development proposed by Vygotsky.

Conclusions and Discussion

The present investigation is assumed to be one of the first attempts to examine the relationships between the developmental models of Vygotsky and Piaget. The findings reported must be considered only as a precursor to more stringent research in this area. The cognitive development of the child prior to age four was not considered by the present study. Considering this limitation, the correlational data reported, although not satisfying to the demanding researcher, do provide the impetus for further investigations.

TABLE 4
CORRELATIONS BETWEEN THE VYGOTSKY STAGE RATINGS
AND THE PIAGET STAGE RATINGS

Vygotsky	Overall Piagetian Stage - Without Explanation	Overall Piagetian Stage - Explanation Considered
Level (Rater #1)	.613	.619
Level (Rater #2)	.609	.623
Level (Rater #3)	.626	.626
Overall Vygotsky Level *	.586	.550

* Based on Stone and Heslop (1968)

Present results lend support to the hypothesized relationship between the cognitive development models postulated by Vygotsky and Piaget. This finding is not surprising as both men were investigating the same phenomena. In fact, correlations of smaller magnitude would be more startling. However, cross-tabulation of individual subjects revealed that 70 per cent fell within the expected category in terms of alternate theoretical systems of cognitive development. Thus it appears quite possible to predict, with reasonable accuracy, Piagetian performance from a knowledge of Vygotskian performance (and *vice versa*). The findings that so few children aged 4 and above appeared to operate in terms of syncretic images suggests that this phase is not comparable to Piaget's pre-operational stage. However, the fact that Vygotsky identified syncretic functioning as one of three major phases of development suggests that it must appear with frequency at some age. It is therefore suggested that it must occur at younger age levels than those included in the study and may compare more closely to Piaget's sensory-motor period.

The questions raised by this investigation suggest that researchers might pursue in more detail the relationship between the earliest stages of both theorists (namely the phase of syncretic images and the sensory-motor period). In addition, as both theorists heavily emphasize the role of language within their frameworks, the linguistic aspects of the two theories warrant more extensive experimentation. Several theoretical formulations regarding the precise relationship between thought and language *ala* Vygotsky and Piaget have been offered. However, little research has been specifically designed to compare the opposing perspectives offered by Vygotsky and Piaget. Preliminary research of this nature is currently being conducted by Bain (1974).

As a final comment regarding the present paper, only aspects of the qualitative data have been presented. Quantitative results of the study are available on request.

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BOOK REVIEWS

EDUCATION AND CHILDREN'S EMOTIONS: AN INTRODUCTION

By Geoffrey Yarlott, London: Willmer Brothers Limited, 1972, pp. 211, £2.50 (U.K.).

This book, which consists of eight chapters, an index, and an excellent bibliography, endeavors to alert teachers and parents to the problems of emotional education in the classroom. What strength the text has arises from the author's consistent outline of the role of formal education in this crucial area. Nowhere else will one find a more reasonable attempt to state what teachers' responsibilities for the emotional education of the children in their care are; and how these differ from (yet interlock with) the responsibilities of parents, counsellors and other significant adult figures. While many problems remain unsolved, the essential clarity of Yarlott's position should make the text a valuable aid for the practising teacher.

The writing itself draws extensively upon recent research findings, theoretical arguments in the field of affect psychology and personal familiarity with the emotional reaction and classroom work of numerous British school children. The model of affective education which arises from this milieu revolves around the author's fundamental distinction between *aroused emotion* and *emotional attitude*. In contrast to the often explosive and short-lived quality of the former, emotional attitude is regarded as an enduring tendency or disposition to react "emotionally" whenever a certain object or type of situation presents itself. As such, it symptomatizes a child's basic orientation to life and it is here that the teacher's main responsibilities reside. According to Yarlott, these responsibilities are best met by creating a classroom atmosphere in which each child is allowed to experiment by weighing his own emotional attitudes against those of other people so that he can begin to clarify them, and find out where he stands in relation to others. "Hence, it is clarification rather than release of emotion with which education should be chiefly concerned" (p. 91).

While such arguments may be logically consistent, the real test for the utility of Yarlott's views lies in the extent to which he is able to indicate exactly what a teacher must do in order that such abstract directives might be realized in the classroom situation. When this criterion is applied to *Education and Children's Emotions*, two chapters stand out as especially worthy of attention—Chapter 2, "What is Emotion?" and Chapter 6, "How Do We Recognize Emotion?" Unfortunately, the remaining chapters tend to suffer, to some degree, from the kind of eclectic uncertainty and platitudinous philosophizing which characterize so many texts which deal with educational topics. Nonetheless, affective education is an exceptionally difficult subject matter and, compared to similar texts, Yarlott's book is well worth the time it takes to read it.

J. Martin

THE INDIVIDUALIZED SYSTEM: STUDENT SOCIAL AND ACHIEVEMENT PATTERNS

By Gordon Laxter, Ross Traub and Katherine Wayne, Toronto: The Ontario Institute for Studies in Education, 1974, pp. 92, \$3.25.

This is an in-depth report of one study in a series of O.I.S.E. projects aimed at discovering the relative merits and demerits of the regulations and recommendations enclosed in the Ontario Ministry of Education's Circular H.S. 1. The basic tenet of the circular, which was formally put into operation in all Ontario schools by the autumn of 1972, is that each individual student be given the opportunity and responsibility for the selection of the courses in his or her high school program. Through an intensive investigation of five Ontario schools which represented contrasting extents of implementation of H.S. 1, the authors of the report attempt to determine the relative effects of such implementation on student social patterns, student and teacher educational attitudes, institutional morale, student achievement patterns and student achievement standards.

The net result is that little definitive evidence on any of these issues is obtained. In their closing moments the authors remark that "this study has hardly dented the problem of assessing the effect of H.S. 1 on the amount of learning that takes place in school" (p. 76), and that "the main deficiencies were our design, our method of choosing schools, and our instrumentation" (p. 77). Given such blatant shortcomings, the reader may well wonder at the wisdom of publishing such a document.

However, Laxter, Traub and Wayne criticize their study too severely. The problems they set themselves are extremely difficult to research and, because of such difficulty, are all too often defaulted to the pronouncements of the arm-chair philosopher. The O.I.S.E. report is valuable; and its value lies in its painstaking delineation of the panoply of variables which must necessarily be considered before definitive adjudications on such educational implementations can be given. The report succinctly and intelligently grapples with the reality of the school environment in all its many facets. Because it does not result in any prescriptions for educational panaceas does not mean that its content should be ignored. The report is a useful input for anyone who is engaged in evaluating the repercussions of educational practices whether innovative or traditional.

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